

The Iron Age

A Review of the Hardware and Metal Trades.

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Anthracite Furnace for the North Jersey Iron Company.

The problem of cheapening the cost of producing pig iron has been seriously engaging the attention of furnace managers and owners during the present depression, and one good effect of the depreciated value of iron is the awakening of a livelier interest in the improvement of the various details of furnace plants. The engravings which we present this week show an improvement in the construction of blast furnaces, designed by Messrs. Weimer & Birkinbine, engineers, of Lebanon, Pa., and Philadelphia. The object of the arrangement is to reduce to a minimum the amount of material required in the construction of a stack, without destroying its efficiency or jeopardizing its permanency. The peculiarities of construction are the substitution of large cast iron housings in the place of the usual masonry piers, or cast columns, the housings being made higher than the ordinary piers or columns, thus exposing more of the bosh walls to the cooling influence of the atmosphere.

A cast iron mantle in the form of a hollow girder rests upon the housings and supports the masonry encasing the stack. The shape of the mantle permits of free admission of air for cooling.

The blast and water pipes pass through openings in and rest upon the housings, obviating the necessity of other supports. A spray pipe is also supported by the housings to project water against the bosh walls when required.

The bosh walls are of fire-brick, 30 inches thick, and are secured at each course by means of bands of inch square iron with T heads resting in slots in the housings. By this means the maximum amount of surface is exposed, and the minimum quantity of iron employed. To reduce the temperature of the crucible walls they are encased with boiler plate to the bottom of the tuyere openings to allow for six inches of washed gravel through which water can be allowed to percolate at will. Above the mantle the stack is built with a fire-brick lining and red brick casing with appropriate loam spaces. The red brick is secured by means of strong iron bands and improved devices, and a boiler iron casing surrounds the top where the "down take" leaves the stack. The top of the furnace is furnished with Weimer's patent charger (which prevents loss of gas when the bell is dropped) and the improved adjustable fence and top covering plates, all of which were described and illustrated in our issue of March 18, and to which reference has subsequently been made in these columns, as they have been applied to various furnaces.

Messrs. Weimer & Birkinbine, who make blast furnace construction a specialty, claim to have in this design materially reduced the expense of erecting a stack, by largely reducing the quantity of brick and iron consumed in its construction, without risking its permanency or economic working.

Mineral Wealth of Russia.

The St. Petersburg Journals publish the text of the speech recently delivered by the Grand Duke Constantine Nicolavitch, honorary president of the congress of delegates of the iron trade, at the closing session of this congress. The following is a translation of the speech:

I rejoice to be able to state that the debates of the congress have been very animated. This fact is the best proof of the necessity of an exchange of ideas on a question so important as the development of the iron manufacture.

Your discussions have fully confirmed the fact that there exists in all parts of the empire an immense wealth of iron ore. Some have sought to prove that the principal deposits of ore are found in the Oural; others affirm that the South of Russia is rich in iron and in coal deposits. The owners of works in the west speak of the richness of their country in coal and iron; and those in the north put in the foremost rank Finland and the northern parts of Russia, where very considerable deposits of ore are found in the mountains and in the lakes.

This is the order of the day, because the railways, the telegraphs, steam navigation, manufactures, and also agriculture urgently demand iron. A century and a half after Peter the Great, the founder of the Russian mineral industry, a new era opened for metallurgy, the era of the Emperor Alexander II, the restorer of civil and economical life in Russia. The national activity is apt to comprehend the requirements of the day, and is, on its side, exerting itself to direct its forces. The proprietors of iron works founded during the reign of

seals will receive an impetus, and when our merchant flag shall float over distant seas; in a word, when our country, peopled by 80,000,000 of toilers, shall set itself to work with the aid of iron at a cheap rate and good machines? At the present time our frontier districts, separated from each other by vast spaces, have each their special local life, and their original development. I am, however, firmly convinced that iron will, in the end, not only reduce distances, but even bring regions nearer together. It will create common interests; in a word, it will be

taken counsel of men who were competent to give evidence upon the subject. Probably some two or three years hence we may hear that the commission is thinking about a report, and that in another year it will appear! It is a fact, nevertheless, that there are many persons who could furnish information to the commission, and whose information would be of infinite value. Theorizing in respect to the causes of fire at sea is useless. What is wanted is the results of past experience. These, when well considered, and combined with scientific deductions, may lead to the institution of effectual plans of fire prevention on the high seas.

Spontaneous combustion, however, takes place on land as well as on the ocean, and thus opportunity is afforded for a consideration of the whole question, even by those who do not "go down to the sea in ships, and do business on the great deep." For ourselves, without wishing to arrogate superior knowledge on the subject of spontaneous combustion, we shall endeavor to indicate a few points which may not be unworthy the attention of Mr. Childers and the commission over which he presides. The general cause of coals becoming ignited in the hold of a ship is the liberation and accumulation of gases escaping from them. The best preventative, therefore, is the extraction and diffusion of these gases. In order to accomplish this there should be laid horizontally between, say every three feet layer of coal in the hold of a ship, a series of perforated pipes meeting in the center and then having an uptake to the deck. The central pipe and branches should embrace the full area of the hold, and, as it were, permeate throughout it. The main pipes should then be connected to a small centrifugal pump or fan, driven by the donkey engine on deck or by a crank propelled by manual power. This arrangement, together with a gas regulator, such as that invented by Mr. Ansell for revealing the existence of fire damp in coal mines, would be found invaluable in preventing fire or giving warning of danger.

If, in spite of such precautions, fire may have broken out in the hold of a coal ship, the air and gas suction might be shut off and through the same mains water could be "flushed" among the burning coals; the water in this case would be so impartially distributed amongst the coals as that combustion would cease instantaneously.

Perforated pipes from deck to keel through the midst of the cargo might be serviceable in some cases, but the greatest preventive of fires at sea would, undoubtedly, be the adoption of a plan of sucking out incipient gases from the hold by mechanical means, such as we have described. If the Royal Commission desires to arrive at a practical conclusion it will do well to ponder over what we say.

At the Ravensdale Iron Works—the first English establishment to successfully introduce the Danks puddling furnace—there lately occurred an accident to the anvil block, on which the immense masses of puddled iron produced by the Danks furnace are hammered. The anvil block that is broken weighed 95 tons. A new capola is already erected close to the bed of the block, with the view of casting a new anvil block, which is to weigh 115 to 120 tons. The metal will be run into the mold made in the bed of the block. This levithan casting will be completed in twelve or fourteen hours from the time the furnace begins to melt the large mass of metal required for its production.

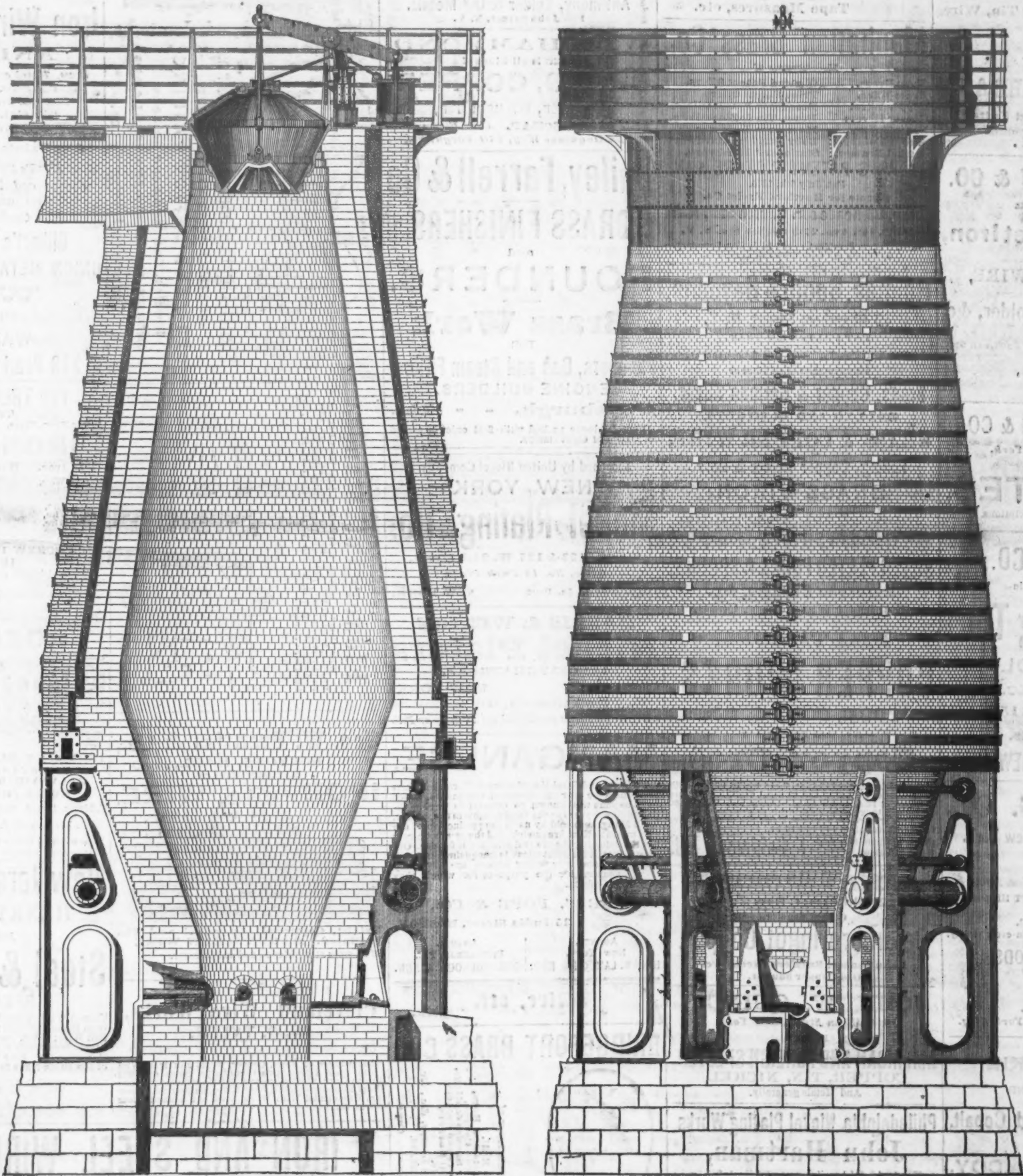
Spontaneous Combustion.

The London Iron Trade Exchange says: It is now some three months since that a Royal Commission was formed for the purpose of inquiring into, and reporting upon, the spontaneous combustion of coal in ships. The proceedings of that commission have not as yet been published, nor are we aware that it has

Peter the Great are far from complaining that their ancestors took the initiative in the mineral industry, while, at the same time, laying the foundations of their present wealth. It will be the same with the new era—the present. Those who will take the initiative in the establishment of iron works and engineering establishments, and will not give in at the first difficulties, which are inevitable, will be the founders of a solid prosperity for their descendants. Already, at the present time, the consumption of this metal is enormous in Russia. What will it become when the face of the country will be covered with a network of railways, when all our navigable water ways shall be traversed by iron steamers, when the agriculturist will employ only mechanical appliances, when the use of machines in various manufactures shall become universal, when the construction of ves-

the source of a perfect similitude in conditions of economy, and the whole of the life of the immense Russian family. Such is the enormous importance of iron! I will say, in conclusion, that I shall watch with the most lively interest the development of works in Russia, and that each of your successes will constitute a new joy for me, which will be, at the same time, a new joy for the whole of Russia.

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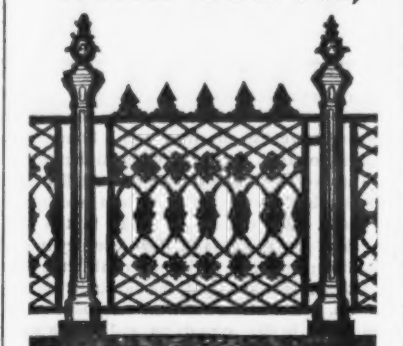
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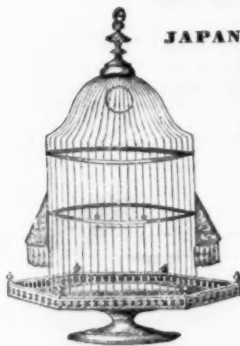
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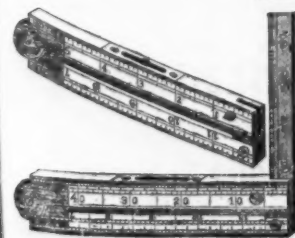
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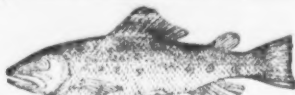
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Trades Unionism the Great Enemy of Industrial Development.

The genial methods of the trades union people, when they have an argument to enforce or a point to gain, have had frequent picturesque illustrations during the present summer, on both sides of the Atlantic. These illustrations are worth the consideration of the general public, because under the new plan of voting themselves a "vacation," these people will doubtless have more leisure in the future than heretofore to still further improve those "vacations," so that no one who stands in the perilous relation to them of capitalist or employer shall be exempt from the system of terror which they have now reduced in its individual application almost to an exact science.

To begin with, take the mild-mannered strikers in the Scotch city of Dundee. The latest mail papers received here contain a report of a great meeting of the brethren there to resist the proposed ten per cent reduction of wages. The rhetoric employed on the occasion was hardly of a kind to be expected from the usually sedate and contemplative Caledonian. There was a touch of the Communist about it belittling the Faubourg St. Antoine rather than "honny Dundee." Resolutions were passed pledging all not to return to work; and it was suggested by one of the operatives that "any who gave in should not only be scouted by his fellow workers, but should be put in a sack and thrown into the Tay"—a sentiment which elicited an outburst of commendation. Putting people "in sacks" and "throwing them into the Tay" may be a very good trades union notion, but it is not an original idea. It is, in fact, a plagiarism from the ancient Venetians and the Turks, who in that way used to get rid of obnoxious rivals or unfaithful spouses. As there are some twenty thousand operatives in that Dundee strike, however, and as, at least, one-third of these are understood to be secretly opposed to the movement, it is probable there will be an active demand for sacks before the summer "vacation" is at an end—at the same time that the navigation of the Tay is likely to be materially interfered with by the mortal remains of the anti-society men who are thus, by wholesale, to be "put out of the way."

Coming nearer home, take now the case of the society men recently engineering the great strike in the Pennsylvania coal regions, as a further illustration of their picturesquely persuasive ways when a "capitalist" or an employer is to be taken in hand. President Gowen, of the Reading Railroad Company, in the course of an argument before a committee of the Pennsylvania Legislature, submits a list of some 200 outrages upon persons and property by the class of persons alluded to in the Schuylkill and Shamokin regions alone, the purpose in all cases being to intimidate workmen who were willing to labor at the best prices they could get, without reference to society dictation. A few of the more flagrant instances of this odious tyranny may be mentioned: At the Ben Franklin colliery—the employees of which were perfectly satisfied with their wages, had accepted the reduction early in the season, and were working peacefully and contentedly—the torch of the incendiary was applied to the breaker at night. These men having families to support, working there contentedly and peacefully, were driven out of employment by a few dangerous men, simply for the purpose of preventing them from earning their daily bread. Mr. Gowen says he had some interest in the subject of the amount of their wages, and he asked the owner of the colliery what his miners were actually earning at the time when they were prevented from working by the burning down of the structure in which they were employed, and he told him the lowest miner on his pay list earned \$60 a month and the highest \$130, and yet, although these laborers were peaceful, law-abiding men, they were driven out of employment by an incendiary fire. At another colliery, within five or six miles of this, a band of 20 or 30 men, in the evening—almost in broad day light—went to the breaker, and by force drove the men away and burnt the structure down. It belonged to a poor man; the savings of his lifetime were probably gone, and his own employees, who had nothing against him, and who were perfectly willing to work, were thrown out of employment and probably remain out of employment to this day. It is only six or eight weeks ago that the men in the Reading collieries signified their willingness to go to work; they told the company they were tired of the strike, and wanted it to start the collieries; and when operations were accordingly resumed, a band of 500 or 600 men appeared and drove them away from their employment, with the exception of those at one colliery. Again, it is but a few weeks ago that the president says he received a letter from a miner, a man who had worked in the mines for thirty-six years, the father of a family and the owner of a household, stating that the writer feared that he and his companions were in the wrong, that they had made a mistake, and that they were anxious to return to work. Mr. Gowen wrote him a letter and endeavored to show him what he supposed to be the folly of the course which his associates had been pursuing. The man acknowledged receipt of the letter, intimating that he was convinced and that the men would return to their employment. It became known through the post office, however, that this man had received a letter from the president of the Reading Railroad Company. He was charged with that as a heinous offence. He had a great deal of personal independence of character, and he met his accusers face to face and asked them whether in this country a man had not a right to write a letter to whom he pleased and to receive an answer, and he defied them. The courage with which he had met them succeeded for the instant, and he left to go to his home, but when he reached his home at night he found there the anonymous notice: "Leave

this country within twenty-four hours or you are a dead man." Of course he was then powerless—for who can defend his life from the secret assassin? The man left—left his family and remained absent until he hoped the affair would be blown over and until the men should return to their senses and he could safely go back to work. These are but a few of the innumerable instances of the same kind of terrorism related by the witness, and it is no wonder, therefore, that he exclaims:

"Gentlemen, we meet next year to celebrate the centennial anniversary of the Declaration of American Independence. We expect to attract to Philadelphia a concourse of the citizens of the whole world. We shall point with gratified pride to an empire built up under republican forms of government. We shall show them to an asylum where the abject, and the humble, and the poor from all climes and from all lands have found a refuge. We shall tell them that the shackles have been stricken from the limbs of millions of slaves. And when we glory in this prosperity, and when we boast of all this freedom, let us not forget that almost within the shadow of Independence Hall tens of thousands of citizens are subject to a tyranny and a despotism such as neither khan nor caliph ever exercised, and such as in the wildest dream of power never was conceived by sultan or by czar."

What avails it to these men that they are ready and willing to work? Of what avail is it to them that we offer them work? Of what avail is it to them that the wages that they could earn would amount to \$100 or \$120 a month? They cannot work; they dare not work; to attempt to do so is to invoke destruction.

"Why, but a few weeks ago we were obliged to conduct the business of the railroad company in the mining region under an armed force. Every passenger train that passed over the road was preceded by an engine with an armed posse. The locomotive engineer, ever foremost at his duty and unflinching at the post of danger, standing with his left hand on the throttle valve and his right upon a pistol, as his train passed through dark glades or by deep defiles, where almost every tree and every rock concealed an armed assassin thirsting for his life. We were obliged to send men armed to the teeth to protect their fellow men in the right to labor; and this police force had to be lowered and passed down the inclined planes over which you passed and which you saw, where the human freight is suspended by a few threads of wire rope. At a time when a number of these officers were about to go down one of these inclined planes, it was found that some cowardly assassin, with an axe, had cut the wire rope in three or four places, not so deeply that the danger should be discovered by the eye, but rather that it should be hidden until the strain was upon it—cut for no other reason than to precipitate to a sudden and terrible death those brave men who were there, in obedience to orders, to protect their fellow laborers in the right to earn their daily bread."

In reading statements of this character, one can scarcely realize that the Commonwealth in which these outrages were perpetrated has a regularly established government, whose first of all duties is to protect the lives and liberties of its citizens. Hence the conviction is again forced upon the mind that but for the inexplicable apathy of its chief magistrate no such terrorism could have been possible. President Gowen, we observe, is silent on this vital point—and we can well understand his silence; but, now that the Legislative Committee has been put in possession of a full history of the case, the public are entitled to anticipate such action at the hands of the next General Assembly as will not only give the Governor to understand that it is high time he had a clearer perception of his duty, but that a repetition of these trades unions or "society" outrages upon individual liberty will never again under any circumstances be possible. The admonition ought to have come before this, but it is better now than never.—Daily Bulletin.

Launch of another Pacific Mail Steamship.

The Pacific Mail steamship City of Sydney was launched Aug. 5th from the yard of the Delaware River Iron Shipbuilding and Engine Works, at Chester. The steamship City of Sydney is of 3500 tons burthen, custom house register, and is the "sister" of the steamships City of San Francisco and City of New York, previously built for the Pacific Mail Company at the same yard. She will be bark-rigged, and will spread 17,000 square feet of canvass, will carry 10 metallic life boats and 10 life rafts, and will be fitted with first-class accommodations in all respects. She will be able to carry 153 persons in the cabin and 1200 in the steerage. Her machinery will consist of two compound engines with a surface condenser and six boilers, and with separate engines for working the air and circulating pumps, and the feed and bilge pumps. The boilers will be cylindrical, 13½ feet in diameter by 10½ feet long, with a working pressure of 90 pounds to the square inch. Each boiler will have three furnaces, and the entire heating surface will be 12,000 square feet. The propeller will be of the Hirsch patent, with a diameter of 20 feet and a pitch of 25 feet. The shaft will be 130 feet long by 16 inches in diameter. It is calculated that the maximum performance of the engines will be from 65 to 70 revolutions per minute, and that in good weather the vessel will make a speed of from 15 to 16 knots an hour. The vessel will be divided by seven bulkheads into eight water-tight compartments, as a precaution against sinking in consequence of collision or other accident. Her machinery, like that of her sister ship, the City of New York, will be constructed in the yard at Chester. The machinery of the steamship City of San Francisco is being constructed at the Morgan Iron Works, in New York, and the vessel will be ready for sea in about a month. The steamship City of New York will be ready for sea in about two months.

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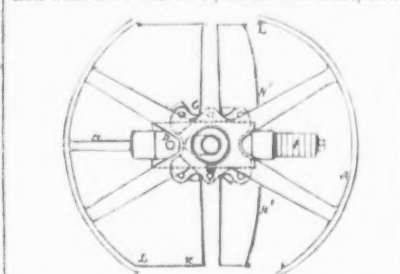
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Northampton, Mass.
Send for Circular and Price List.

New Patents.

We take the following abstract of new pa-
tents, recently issued, from the official record:
CATCH PLATE FOR BAG LOCKS.

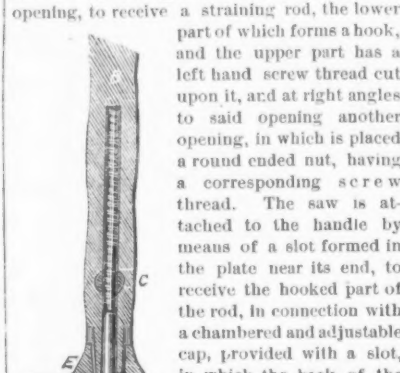
To Wm. Roemer, Newark, N. J.—A catch
plate for bag locks consisting
of the plate A, catch a, per-
forated lips b, b, and bent
handle d, made in one piece
of metal.

GOVERNOR FOR STEAM ENGINES.
To G. C. Sims, Lawrence, Mass.—In combina-
tion with the eccentric F, its tubular shaft, and



the carrier or slide D thereof, applied to the fly-
wheel, and provided with the weight, as de-
scribed, the spring H, fastened at its middle to
the slide, and at its ends connected to the fly-
wheel.

HANDLE FOR CROSS-CUT SAWS.
To E. Andrews, Williamsport, Pa.—The
handle has a longitudinal cylindrical central
opening, to receive a straining rod, the lower



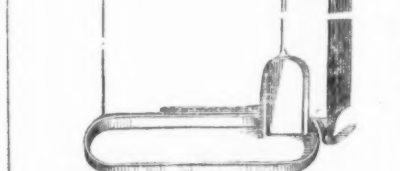
part of which forms a hook,
and the upper part has a
left hand screw thread cut
upon it, and at right angles
to said opening another
opening, in which is placed
a round ended nut, having
a corresponding screw
thread. The saw is at-
tached to the handle by
means of a slot formed in
the plate near its end, to
receive the hooked part of
the rod, in connection with
a chambered and adjustable
cap, provided with a slot,
in which the back of the
saw rests, and ferrule hav-
ing shoulders and a taper-
ing neck to fit said cap.

By turning the handle to
the right the saw is firmly clamped in place.

1. The combination, in a handle for cross-cut
saws, of the straining rod F, with its upper end
cut with left hand threads, and a corresponding
threaded nut, C.

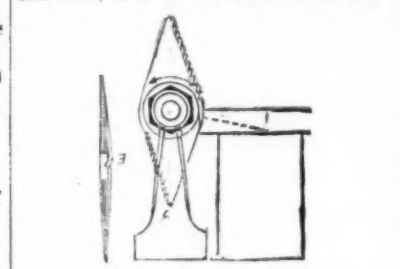
2. The movable cap E, provided with a central
opening and a groove upon one side of the same
across its greatest diameter.

COAL VASE AND FIRE IRON STANDARD.
To George J. Munschauer, Buffalo, N. Y.—



The combination, with a coal scuttle, of the
curved pivoted arms a a near the top of the
scuttle, and the dish or plate b hinged near the
base of the scuttle.

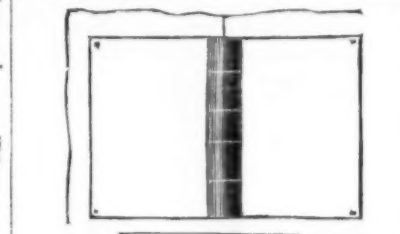
SAW.
To C. A. Brown, Brooklyn, and C. E. Sedore,
New York, N. Y.—A cuneiform notch can be



cut in a plank or other article by means of a
rhomboidal shaped saw blade, having teeth on
two of its parallel edges, and tapering in thick-
ness from the middle to the ends.

A rhomboidal saw blade having teeth on two
of its parallel edges, and tapering in thickness
from the middle to the ends.

COVERING PLATE FOR HINGES.
To Henry T. Blake, New Haven, Conn.—A thin
sheet metal plate is formed with bent tongues

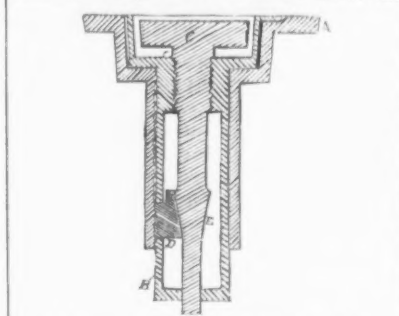


upon its inner edge, which engage with and
pass beneath the corresponding parts of the
knuckle of a hinge. The covering plate is then
bent over, and its opposite edge or corners se-
cured by small tacks or other suitable fasten-
ings—the method furnishing a simple and

inexpensive covering for the ordinary butt
hinge.

The herein described covering plate for butt
hinges, consisting of a thin plate of sheet
metal, with bent tongues upon its edge, to pass
beneath the parts of the knuckle of the hinge,
to secure the inner edge, combined with means,
substantially as described, to secure the oppo-
site edge.

BENCH HOOK.
To Chas. E. Smith, Lowell, Mass.—The dog is
retained at any desired elevation above the



bench by means of a holding block, acted upon
by a conical screw wedge, which forces it into
the corrugations of the case.

The bed plate A, provided with the extension
A', in combination with the hook B B, thumb
screw C, with its conical wedge E, and wedge
block D.

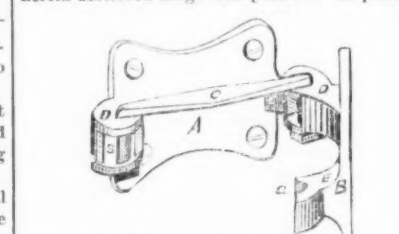
TONGUEING AND GROOVING PLANE.

To Charles G. Miller, New Britain, Conn.—By
means of a shifting guide, eccen-
trically attached to a vertical shaft,
bung and rotating in a socket se-
cured to the side of the stock,
which can be adjusted so as to
cover or uncover the planing bits,
the tool can be used for tongueing
or grooving the edges of boards.

In combination with the body or
stock a and the chisels d d', the
guide f, having adjustments to
cover and uncover one of the
chisels.

GATE HINGE.
To Geo. Marsh, Marshall, Mich.—

A hinge opening both ways has a single con-
necting bar, whose ends serve as pintles. The
herein described hinge composed of the plates



A B, provided with the heads D D, recessed at
a a, and connected by the rod C of one piece
with the pintles, in combination with the lugs
E, having flanges e e and grooves a.

Death of Benjamin Bannan.

Mr. Benjamin Bannan, for many years known
as an authority on the statistics of anthracite
coal, and a successful journalist, died at Potts-
ville, Pa., on the 31st ult. The following is
contributed to the Philadelphia Ledger by its
Pottsville correspondent: He was born in Union
Township, Berks county, April 22, 1807; re-
ceived a common school education, and was ap-
prenticed at the office of the Berks and Schuyl-
kill Journal. At the expiration of his appren-
ticeship he was offered an interest in the busi-
ness, but declined, and went to Pottsville and
purchased the Miners' Journal, April, 1829, for
\$800. From that time to January, 1875, he con-
ducted the Journal, weekly and daily, making
it the best known of any of the interior papers
in the country. From 1873 to within two
weeks of his death he was a constant contribu-
tor to its columns. He was a strong writer of
original ideas and cared little for popular ap-
plause, advocating what he thought right fear-
lessly and forcibly. While provoking many ad-
versaries none ever questioned his honesty of
purpose. He is believed to be the first to sug-
gest a plan for a national currency, and pub-
lished his plan in the Journal, of December 30,
1857, sending copies of it to members of Con-
gress; S. P. Chase being in the Senate at the
time.

Afterward, when Chase was Secretary, he
called his attention to the plan, when Chase ad-
mitted that it had now become a national ne-
cessity. The principal features of his plan were
embodied in Mr. Chase's bill. He was the au-
thor of the Normal School system of this State.
Always a protectionist, he labored with pen and
speech to advance the cause. He proposed and
organized the first Tariff League in 1840. As a
coal statistician, he was the foremost in the
country, and has been designated by the Bureau
of Statistics on several occasions as the most
competent person to furnish information on the
coal trade when applied to by persons
from abroad. He published during the war
"Coal, Iron and Oil," the most effective work
on the subject extant.

The Ore Trade at Cleveland.

The Manufacturing and Trade Review, of
Cleveland, says: Some five weeks ago we
made a careful estimate of the amount of iron
ore sold by the Lake Superior Iron Mining
companies up to that time, from reports re-
ceived of their agents in Cleveland, and found
the amount contracted for delivery this season
to exceed 600,000 tons, nearly 240,000 tons of
which were for delivery at Green Bay and Lake
Michigan ports. Fourteen of the leading
mines were included in the estimate, and as 36
mines were opened last year, we added 50 per
cent. for sales which we had no knowledge of,

and which might be made during the balance
of the season, which brought the total estimate
up to over 900,000 tons.

It appears now that these figures were too
high. At least, they are considered so by
parties interested. We had do desire to em-
bellish the business, but to keep our readers
informed as to facts; and with the same ob-
ject in view we now give the statement of
agents that the product will not come near up
to that of last season, which was over a million
of tons, and that the resolution of producers,
adopted early in the season to not ship any
more ore than was sold will be absolutely ad-
hered to.

It will be seen by our advices through the
Mining Journal that the total shipments this
season, up to 21st inst., were but \$99,483, gross
tons. This compared with a total of over
1,000,000 tons last season, does not look as
though our first report of 621,500 tons, at first
contracted for, would more than fill up the
season's business. And more particularly is
this the case because the chartered vessels in
the trade have been running full so far this
season, and their contracts are now about com-
pleted, and the balance of the work will have
to be done by vessels which only take ore
freights when nothing more profitable can be
found.

The First Bell in America.

The Philadelphia Ledger publishes the fol-
lowing interesting item: "Campanella" writes
to this office to know whether a church bell,
sent from France to Kaskaskia, Illinois, in the
year 1700, is "the first bell that ever tolled on
the American Continent," and he refers to a
paragraph in the Sunday Dispatch, which says
it was not, and which mentions other bells in
this country as being older. The paragraph in
the Dispatch was right, as that paper usually
is on such subjects. We need not go, how-
ever, either to the Spanish settlements in
Florida, or even as far as New York, to find an
older bell than that in Illinois, nor even trust
to the vague inscription quoted from the bell
of the Swedes' Church (Gloria Dei), near the
Navy Yard, which says (1806) that it was cast
from an old bell, dated 1643. In the History of
New Sweden, by Israel Acrelius, a translation
of which, by Dr. Wm. M. Reynolds, was re-
cently published by the Historical Society of
Pennsylvania and Delaware, there is a state-
ment concerning a bell on the old Swede's
Church at Tinicum (Tenacon), Delaware coun-
ty, which is quite explicit as to one date. The
statement is in the form of a certificate of
transfer from a daughter of Governor Printz
(one of the early Swedish rulers on the Dela-
ware). It reads thus:

"LAUS DEO, May 24, 1673.

"I, the undersigned, Arnegot Printz, ac-
knowledge to have transferred to the congrega-
tion of the Adherents of the Augsburg Con-
fession in this place the bell that has been on
Tennakong, that they may do therewith what
pleases them, and promise to keep them free
from all claims that may be made, etc., etc.,
etc.,
ARNEGOT PRINTZ."

There was great complaint about this among
the Swedish congregation of the Tenacon
Church, and they bought their bell back again
by two days' reaping in harvest time. Tine-
cum or Tenacon (which is variously spelled by
Acrelius) was the official residence of Gover-
nor Printz, who arrived there in 1643, and built
a church in 1646, which was consecrated on the
4th of September in that year, and elsewhere in
the history said to be the first Swedes' church
built in America. It was on this church that the
bell was that was sold by his daughter, Arne-
got, in 1673. There can be no doubt that the
old Tinicum bell was "tolled on this Conti-
nent" at least half a century before the Kas-
kaskia bell.

Vermont Copperas.

This important chemical is manufactured in
Strafford, Vt., and is remarkable not only for
its great purity and strength, but for the
unique method of its manufacture. In all
other places in this country and we think, in
the world, the manufacture of copperas has
been merely conducted as a secondary opera-
tion, for using to advantage the acids that
would otherwise be thrown away as useless
from numerous kinds of manufacturing estab-
lishments.

In Strafford, however, the ore, which resem-
bles, chemically, iron pyrites, is mined from
the top of a hill, and is thrown in the fall, in
heaps of perhaps a thousand tons each, upon a
previously prepared bed of wood. The whole
affair is then lighted and a vigorous combus-
tion results, which throws off the superfluous
sulphur contained in the ore. A stream of
water is turned on when the mass is thought to
have lost sufficient sulphur, and the heap is left
over winter, containing heat enough, however,
to keep itself free from snow.

In the spring, after the frost is out of the
ground, the water is again allowed to run
through the heap, and dissolves the copperas.
The liquid is thoroughly evaporated by being
allowed to trickle over boughs and brush in the
"brush house," after which, whatever passes
through is boiled to a hydrometrical strength
of about 36°, when it is allowed to crystallize
in large, shallow, cement-lined pans. All the
liquid, however, does not crystallize, and this
residue, or "mother liquid," as it is called, is
returned to the boilers to receive a second heat-
ing. It then remains only to gather up the
beautiful green crystals and ship them to the
consumer.

Copperas is much used in dyeing and in the
manufacture of ink and Prussian blue, as well
as in tanning. It was also largely employed at
one time for the manufacture of sulphuric acid,
which latter received its popular name—oil of
vitriol—from the fact that copperas was com-
monly known as green vitriol.—Paper Trade
Journal.

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 soluble Siliceous Matter in a Limestone..... 10 00
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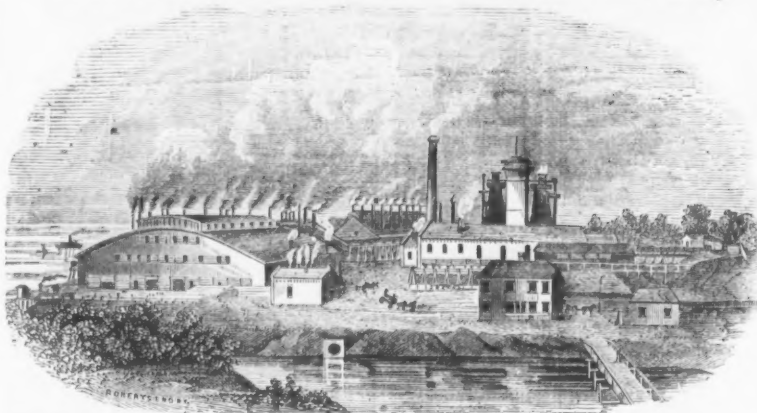
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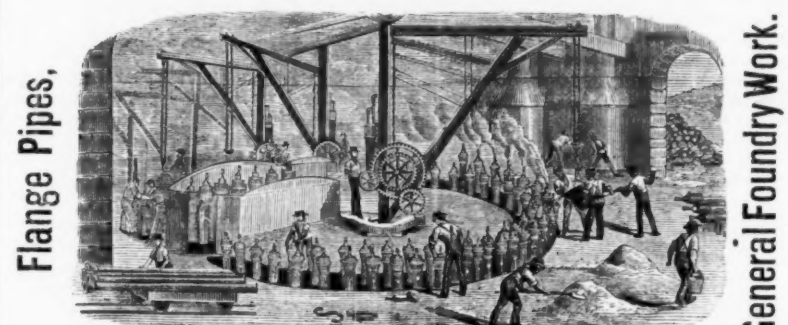
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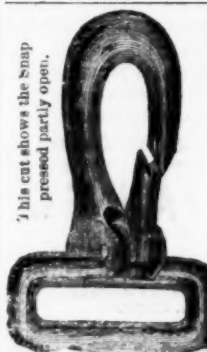
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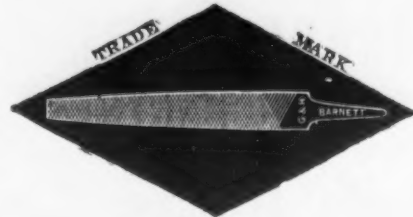
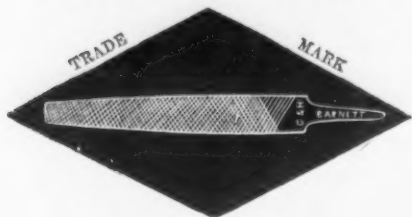
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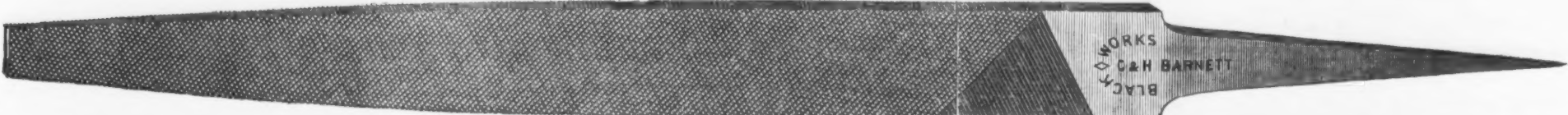
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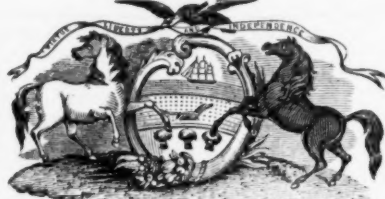
THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL.

TRADE MARK.

HIGHEST PREMIUM.



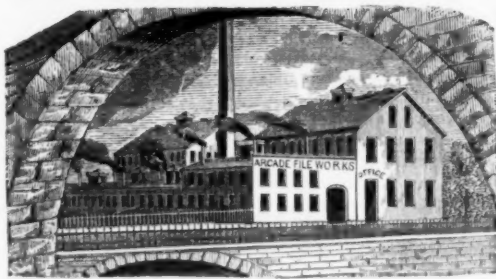
PENNSYLVANIA FILE WORKS.

McCAFFREY & BRO.,

No. 1732, 1734 & 1736 North Fourth St., Phila.

Messrs. ARNOLD & CO., 310 California St., San Francisco. Sole Agents for the Pacific Coast.

ESTABLISHED 1848.



C. T. DRAPER & CO.

Sing Sing, N. Y.

HAND CUT

FILES AND RASPS

Made from Best

ENGLISH CAST STEEL.

Quality guaranteed by written warranty when required.

Eagle File Works.

Established 1857.

Madden & Cockayne File Co.

(Late WHEELER, CLEMON & CO.)

Manufacturers of the

Old and Well Known "WHEELER, MADDEN & CLEMON" Brand of

FILES.

Middletown, Orange Co., NEW YORK.

JOHN I. BROWER & SON,

Hardware Merchants,

288 Greenwich Street, NEW YORK.

HORSE SHOES.
Harden's,
Perkins',
Snow,
Rhode Island,
Woodenough,
Huebnerger.HORSE NAILS.
Putnam's,
Globe,
Vulcan,
Ausable,
Ausable Pointed & Polished,
Ausable Pointed & Blued.HORSE RASPS,
Thos. Turner & Co.'s,
Sheffield Eng.
TOE CALKS,
Winsted.
HAY RAKES,
Breakenridge's.

L. B. HELLER & CO.,

Manufacturers of Celebrated

American Horse Rasps and Files.

OFFICE, 199 Market Street,
P. O. Box, 223. NEWARK, N. J.

Importer and Manufacturer of
Steam Water Gauges,
Pipe and Fittings,
Scotch Glass Tubes,
Tube Expanders,
Twist Drills,
Emery Wheels,
Pipe Fitters' Tools,
Moulders' Tools,
Blacksmiths' Tools,
Machinists' Fine Tools
Forges,
Hammers,
Wheelbarrows,
Wrenches,
Jack Screws,
Vises,
Flue Brushes,
Waste,
Belting,
Hose,
Packing,
Stubs' Goods,
Hair Felt,
Polishing Felt,
Emery Cloth,
Hand Drills,
Iron Punches,
Iron Shears,
Files,
Governors,
Bolts,
SEND FOR PRICE LIST.

50 and 52 JOHN STREET, NEW YORK.

ELIAS G. HELLER.

PETER J. HELLER.

GEO. E. HELLER.

JOHN J. HELLER.

HELLER & BROS.
NEWARK, N. J.

We invite the attention of the trade to our Celebrated American Horse Rasps and Files. These Rasps are made from the very best American steel, all cut by hand, and we warrant them equal to any other make in the market. For the information of persons unacquainted with our goods, we will state that every File or Rasp manufactured by us, since our establishment in 1866, have been stamped "Heller & Bros." though commonly called the "Heller Rasp." All Rasps not stamped as annexed diagram are not genuine. We will send sample lot, if requested, and if not as represented they can be returned, or held subject to our order, free of all charges. For sale by the leading Hardware Dealers in the United States.

BACKUS BROTHERS,

Manufacturers of

The Backus Water Motor,

Cor. Wright St. and Ave. A,
Bet. Chestnut St. & S. Broad St. Depot, Newark, N. J.

What They will do.

These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Church Organs, Sausage Cutters, Ice Cream Freezers, Elevators, Hoisting Machines and every thing requiring similar power, in cities or towns where there are Water Works.

And the best "Motor" in the world for family sewing machines. Send for Circular.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

STUBS' FILES, TOOLS & STEEL,
W. J. Davies' Sons' London Emery Cloth,

HUBERT'S FRENCH EMERY PAPER.

AUBURN FILE WORKS,

Superior Hand-Cut

FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

FULLER BROS., Sole Agents,

89 Chambers and 71 Reade Streets, N. Y.

JOHN ROTHERY'S

Celebrated Hand-Cut FILES,

Made of Best English Cast Steel.

WALSH, COULTER & FLAGLER, Sole Agents,

83 Chambers and 65 Reade Streets, N. Y.

FLORISTS' GOODS.

Aquaria, Ferneries, Flower Pot Stands,

FLOWER POT BRACKETS, BIRD CAGE HOOKS, &c., &c.



BUILDERS' HARDWARE.

Patent Zinc Stove Platforms.

G. WEBSTER PECK,

Manufacturers' Agent.

110 Chambers Street, New York.





A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of
COPPER & IRON TACKS, TINNED TACKS;

SUPERIOR SWEDS IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails, Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails,

Fine Two Penny & Three Penny Nails, Channel, Cigar Box & Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

OFFICES AND FACTORIES AT TAUNTON, MASS. WAREHOUSE AT 78 CHAMBERS STREET, N. Y.,

where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

Works, Darlington, N. J.

69 Duane Street, N. Y.

Hand Made Locks and Real Bronze Hardware.

NEW AND ARTISTIC DESIGNS FOR

Private Residences, Banks, Churches and Public Buildings.

OTIS PASSENGER —AND— FREIGHT ELEVATORS

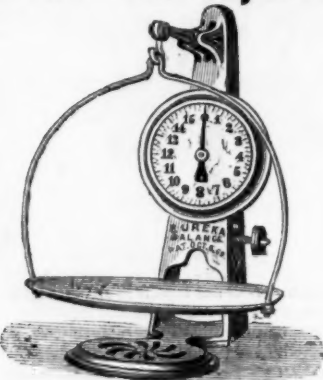
FOR HOTELS, OFFICE BUILDINGS, STORES,
WAREHOUSES, FACTORIES, MINES,
BLAST FURNACES, &c.

OTIS BROTHERS & CO.

SOLE MANUFACTURERS,

348 Broadway, New York.

Eureka Self-adjusting



SCALES.

Have a patented attachment for ascertaining
the tare of a dish or other receptacle used in
weighing without the use of weights or loss of
time. Manufactured only by

JOHN CHATILLON & SONS,
91 & 93 Cliff St., N. Y.

THE CANADIAN BANK OF COMMERCE.

Capital - - \$6,000,000, Gold.
Surplus - - \$1,800,000, Gold.

The New York Agency, 50 Wall St., N. Y.

Buy and sells Sterling Exchange, makes Cable
Transfers, grants Commercial Credits, and transacts
other Banking Business.

J. G. HARPER, Agents,
J. H. GOADBY.

HOISTING Machinery

Mfd. by
CRANE BROS.
MFG. CO.,
Chicago.

CROCKER BROTHERS,

32 Cliff Street, N. Y.

METALS.

Anthracite Pig Irons,

COLD AND WARM BLAST CHARCOAL IRONS,

American and English Bessemer Irons, Iron Ores.

COPPER, TIN, &c.

Advances made on Merchandise.

RHODE ISLAND HORSE SHOE CO.,

OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.

Manufacturers of
PERKINS and RHODE ISLAND PATTERNS of
HORSE AND MULE SHOES.

AMERICAN LOCK MFG. CO.,

Manufacturers of

FELTER'S

Locks & Latches,

Comprising

Store Door Locks, Night Latches,

Drawer, Desk and Pad Locks,

All of which are furnished with

SMALL, FLAT, AMERICAN STERLING METAL KEYS,

Which are stronger than steel, and cannot be affected by rust, and will remain bright and clear under
all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience,
and safety, they challenge comparison with any now before the public. Being made entirely by new and
expensive machinery, especially constructed to manufacture them, they will rival the best made
locks in finish and perfect operation.

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock
ever presented to the public, having thirty-five finely finished Brass Tumblers in each Door, and twenty-
eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of
springs, which cannot be said of any other patent Tumbler Locks in use.

THE LOCKS ARE FITTED TO THE KEYS,

And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

For descriptive list and terms, address

AMERICAN LOCK MFG. CO.,

OFFICE and WORKS, Cazenovia, N. Y.,

Or, UNION NUT CO., Agents,

75 Beekman Street, New York.



FULL SIZE OF KEY.

BUSINESS ITEMS.

NEW YORK.

R. L. Howard, Buffalo, recently shipped to
Vermont a hydraulic press of his manufacture,
weighing nine tons and capable of a pressure
of nearly 1100 tons. It will be used in a paper
mill.

Night and day with 175 hands is the way they
do things at the Syracuse Iron Works, Syracuse.
The works cover two acres, and have a capacity
for turning out 6000 tons per year of band
and hoop iron, bars, rods, scrolls, oval, horse
shoe iron, &c. They have in use four double
puddling furnaces, one single one and six heating
furnaces. The steam-power consists of two
engines of 150 horse each, with several smaller
ones. The yearly consumption of coal is 10-
000 tons, 4000 to 5000 tons of pig iron and 1000
to 1500 tons of scrap iron. Their band and
hoop iron is largely sold in the Eastern States,
where it is very popular. Charles E. Hubball
is secretary and treasurer of the company.

Over 300 "Little Giant" turbine water-wheels,
manufactured by the Merrell Brothers, Auburn,
are now in use. J. C. Wilson has bought the
right of making these wheels in Canada, and is
now manufacturing them at Picton, Ontario.
The Merrell Brothers have now been running
four years, and are at present employing 25
hands.

PENNSYLVANIA.

New machinery is being put in to increase
the capacity of their works by the Pittsburgh
Hinge and Butt Factory, located at Beaver Falls.
The factory is running to its full capacity,
with orders two months in advance.

The Hazard Manufacturing Company, of
Wilkesbarre, has just filled an order for two
wire ropes, one 2000 and the other 1800 feet
long. They were shipped to Virginia City,
Nevada, this week, and are to be used for hoist-
ing ore from a silver mine.

The Mount Hope Furnace, of the Messrs.
Grubb, in Lancaster county, has resumed opera-
tions after lying idle for five years.

The employees in some of the departments of
the railroad shops at Altoona are now working
twelve hours per day. This is necessary in order
to hasten the completion of several improved
postal cars at present in course of erection.

CONNECTICUT.

The Farist Steel Co., of Windsor Locks, will
start their works in about a week. These
works have been closed since the recent coal
strike occurred, at which time it was impossible
to get the kind of coal required for the manu-
facture of steel. They have orders ahead to
keep them busy for some time, and no doubt
will have all they can possibly do. The prop-
rietors of the above works are also proprietors of
the steel works in Bridgeport, under the firm
name of Farist & Windsor, at which place they
have recently greatly increased their facilities
for getting out more work than heretofore.
Although they are working considerable over-
time, they cannot keep up with their orders.
If business should continue with them as it is
at present they will be compelled to make fur-
ther additions to their already extensive works,
so that they can fill their orders promptly.

An electric magnet, weighing 1800 pounds,
was lately shipped to West Point by Wallace &
Sons, Ansonia. The magnet has a sustaining
capacity of 60 tons.

In consequence of dull times the Pequot
Mill, at Norwich, has suspended operations.

The working force at the Consolidated Road's
car shops, in New Haven, has been greatly re-
duced on account of dull times.

NEW HAMPSHIRE.

Blood's Locomotive Works, at Manchester,
will be run for the present only five days in a
week. About 150 workmen are employed there
now, which is less than one-fourth required to
run the works at full capacity.

RHODE ISLAND.

The Providence Tool Company have just sent
off another large lot of the rifles ordered by the
Turkish government. The manufactory is kept
running day and night, and the rifles are being
turned out quickly and in large numbers.

MASSACHUSETTS.

The Washburn Iron Works, at Worcester, are
closed for an indefinite period, on account of
hard times and a lack of orders. This stoppage
will throw several hundred workmen out of em-
ployment.

The tack factory at Assonet will resume
operations this month, with an increased num-
ber of machines.

The American Tool Company runs its foundry
at Hyde Park two-thirds of the time with
half the usual hands.

OHIO.

The Cleveland Rolling Mill Company have
decided to increase their facilities for making
all kinds of iron by introducing, within the
next ninety days, the Siemens-Martin process
for making soft steel for boiler plate and other
purposes. The capacity of this addition will
be two furnaces, seven tons each, with gas
producers and other appliances for smelting.
They have also decided to put up a new build-
ing over the old mill, entirely of iron. There
are now employed around the old mill 2030
men, independent of the plate mill, and the
pay roll amounts to \$100,000 per month.

The steam riveting machine, Cleveland, re-
cently erected in the new boiler shops of the
Fulton Iron Works, performs its duty rapidly
and effectually.

The Edge Tool Company's building, in
Leetonia, is nearly completed.

A knitting machine factory is to be estab-
lished at Norwalk, by the Curtiss Manufac-
turing Company, with \$90,000 capital.

The Cuyahoga Iron Works, Cleveland, lately
made a lot of heavy peat machinery for a party
of Cleveland capitalists, who intend to manu-
facture peat at Morrison, Ill., by the hydraulic
pressure process. The machinery has already
been shipped to its destination.

The Cleveland Rolling Mill Company are

carrying out their intention of making steel
boiler plate by having erected two Martins-
Siemen furnaces, of seven tons capacity each.

INDIANA.

The Eagle Machine Works, Indianapolis,
have made large shipments during the past
month of the separators and portable engines
to St. Louis, for the Western trade, and to
different parts of Kentucky and other Southern
States. They are having some difficulty in ob-
taining a sufficient number of workmen in their
wood-working department.

The foundry and machine shop of W. S.
Lincoln, and the plow handle factory of J. H.
Tucker & Co., at Logansport, were partially
burned July 29. Loss, \$10,000; fully insured.

Steel Rails on the Pennsylvania Rail- road.

The Pittsburgh Commercial says:

During the present year the Pennsylvania
Railroad Company has purchased and laid down,
on its various divisions, over 20,000 tons of steel
rails. The main track between this city and
Philadelphia is now laid entirely with steel, and
the New York division will have no iron rails
by next April. The company first commenced
to lay these rails in 1860, and every year's ex-
perience demonstrates their economy. The
immense traffic which now comes over this road
makes the life of an iron rail a short one, and
in certain localities it would be worthless in less
than six months.

Iron rails, indeed, have been in continuous
use for over 30 years, and a section of such a
rail was lately shown at a meeting of the Frank-
lin Institute; but then these rails have lain
much of that period on sidings where there
have been no heavy traffic. A good steel rail
will stand the wear and tear of continuous use
on the Pennsylvania road for from 7 to 12 years.
Mr. Brown, Chief Engineer of Maintenance
and Way, has in his office the section of steel
rail which has stood the severest test a rail can
receive, and that was in the Pittsburgh yard,
over which the heaviest trains are continually
being shifted. After seven years' use, on a
curve, there seems no reason why there should
not be two or three more years' service in it.

Experience has shown that a modification of
the usual form of the T rail would make it more
serviceable, and within the past year all the rails
rolled for the company have been rolled with
wider flanges and thicker head, without increas-
ing the standard weight of the rail, 67 pounds
to the yard, the material being taken from the
shank or upright section. The form of the
shank has been changed, the section represent-
ing the frustrum of a cone, instead of being
elliptical. This is the form the head always
assumes after use, the flanges of the wheels
wearing off the bulge of the elliptical head.
The flange has been widened, which will pre-
vent the rail, to some extent, from cutting into
the ties, which suffer more from this than from
decay.

The present amount of traffic over the road
would make it almost impracticable to renew
the track with iron rails as often as they would
wear out, as from the great number of trains
there would be no opportunity. The 20,000
tons of steel rails purchased will lay 207 miles
of single track, and it is the intention to renew
all the main track with steel. The sidings will
be of iron. The first cost of steel, as compared
with iron, is now about 50 per cent. greater.

In the year 1871, the work of straightening
several very objectionable curves in the track
between Philadelphia and Downingtown was
commenced; the object being not so much to
save distance as to decrease the wear upon the
rails and rolling stock. This work was com-
menced on the section between Ardmore and
Rosemont, the length of the new route being
2-4-10 miles. This was the most important of
all the charges to be made.

In 1871 a curve was straightened between
Rosemont and Villanova, the new route being
5200 feet long, and a section west of Radnor,
a distance of 6100 feet. In 1872 a change of 3200
feet was made near Radnor, and in 1873, be-
tween Malvern and Glenloch, two sections were
straightened, one of 4100 feet, and the other of
5280 feet; a third section of 4313 feet, between
the same points, was commenced in that year,
and was completed in 1874.

The financial crisis coming on in the fall of
1873 put a stop to this kind of work, and
changes in the three short sections between
Eagle and Paoli, and one between Glenloch and
Valley Creek, which had been surveyed and
staked, were left for a more favorable state of
affairs. In all these changes the road bed and
bridges have been constructed for four through
tracks. There are already four laid to Over-
brook, and they will be constructed as rapidly
as the traffic increases. There are already of
single track and sidings, 1536 miles on the main
or Pennsylvania division; 722 miles on the New
Jersey division, and 499 on the Philadel-
phia and Erie division, making in all 2807 miles
of single track.

The Columbia (Pa.) Spy says: Messrs
Becker & Reinhold, proprietors of Chickies
Rolling Mill, had a most successful run for
the month of July. With two double and one
single furnace, equal to the capacity of five
ordinary single furnaces, they made, in 25
working days, 250½ tons of muck bars, of
superior quality. The stock used to effect this
result was the Chickies brand of pig iron,
from Messrs. E. Haldeman & Co.'s. Chickies
furnaces, and bituminous coal from the Morris-
dale vein. Taking into consideration the
capacity of the mill and the hot month of
July, we doubt whether this run has ever been
excelled in this State. No extra men were
employed during the month, one puddler and
his helper working each single furnace re-
spectively. The maximum charge was five
hundred pounds to a heat. The average waste
was 6½ per cent., 1750 pounds of coal being
consumed for a gross ton of muck bars. This
immense result, in the midst of the unpre-
cedentedly hard times, reflects much credit
upon Messrs. Becker & Reinhold as well as on
Messrs. E. Haldeman & Co.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF



Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

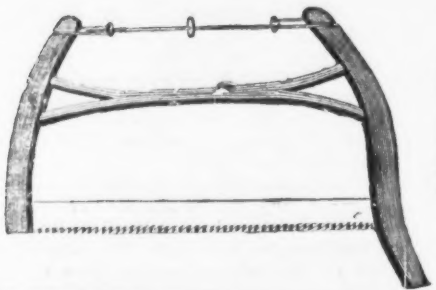
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,

MANUFACTURER OF

Saws of all kinds.

FACTORY, WILLIAMSBURGH, N. Y.



Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,
PERFORATED CROSS-CUT SAWS
And SOLID SAWS of all kinds. Trenton, N. J.

**THE SILVER STEEL
DIAMOND CROSS-CUT SAW.**

\$1.50 Per Foot.

Patent Secured



THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by E. C. ATKINS & CO., Indianapolis, Ind., who are the **SOLE MANUFACTURERS FOR THE UNITED STATES.** So confident are we that this is the best Cross-cut Saw in the market that we **CHALLENGE THE WORLD.** Orders promptly filled.
E. C. ATKINS. H. KNIPPENBERG. Saw Manufacturers and Repairers, Indianapolis, Ind.

**Lloyd, Supplee & Walton,
HARDWARE FACTORS.**

MANUFACTURERS OF

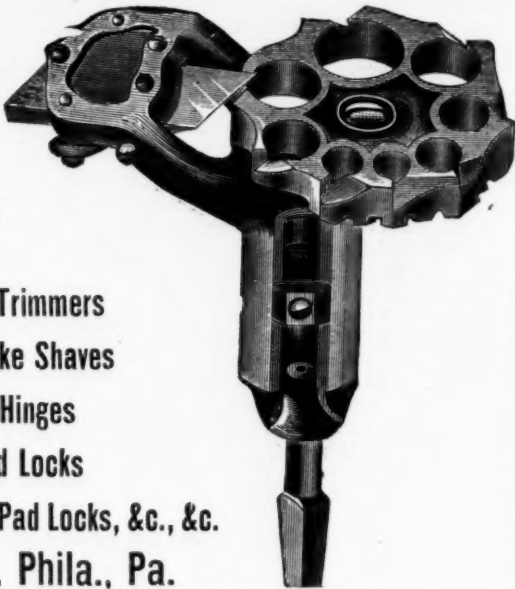
**Bonney's Hollow
AUGERS.**

Stearn's Hollow Augers
and Saw Vises

Bonney's Spoke Trimmers
Double Edge Snook Shaves
Adjustable Gate Hinges
Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

**Wheeler, Madden & Clemson****MFG. CO.,**

MIDDLETOWN, - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL**SAWS**

Of every description, including
Circular, Shingle, Cross-Cut, Mill, Hand,
WOOD SAWS, Etc., Etc.

E. M. Boynton,80 Beekman Street,
NEW YORK,

Manufacturer of

Saws of all kinds.
LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, outlined on M tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

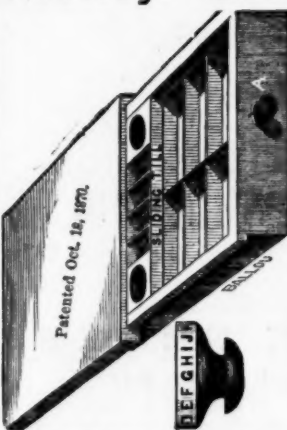
To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 3, 1874.

For fuller report of this exhibition see the *Eastern Morning Dispatch* of Oct. 1st, 1874.
Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

**EXCELSIOR
Money Drawer.**

C. PIERPONT & CO., Manufacturers,
New Haven, Conn.
Sempie, Birge & Co., General Western Agents,
18 S. Main St., St. Louis, Mo.

The lock in this Drawer has twenty-six changes, and is so constructed that an unauthorized person cannot open it. The proprietor can change the letter, and all former knowledge is rendered useless to outside parties.



make a specialty of the **LARGEST SIZES** of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence:
Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed **BALANCES PERFECTLY**, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention to this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time **RUN TRUE**. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.**J. FLINT,**

Manufacturer of

**ALL KINDS OF
SAWS**

And Plastering Trowels,
ROCHESTER, N. Y.

A large Stock of Cross Cut Saws constantly on hand. Orders filled promptly. Dietrich's Double Handle and Hand Cross Cut Saws made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.

V. G. HUNDLEY, Agent,

79 Rensselaer St., N. Y.

NORTH CAROLINA HANDLE CO.,

(Wilson & Shober, Props.)

Manufacturers of
**AXE, PICK, GERMAN & AMERICAN
SLEDGE, and other Handles.**
Full assortment always on hand.

**LE COUNT'S
Pat. Machinists' Tools.**

REDUCED PRICES.

Set Iron Dogs, 1/2 to 2 in. \$ 5.00
" " 2 to 4 in. 12.00
" Steel " 1/2 to 2 in. 6.00
" " 2 to 4 in. 13.00

Iron and Steel Clamps, Die
Dogs, Clamp Dogs,
Vise Clamps, Expanding Mandrels, &c.

Send for latest Price Lists to

C. W. LE COUNT,

South Norwalk, Conn.

VAN WART, SON & CO.

Hardware Commission Merchants,

BIRMINGHAM, - ENGLAND,

Agents.

VAN WART & McCOY,

134 & 136 Duane Street, N. Y.

George H. Gray & Danforth,

48 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for
**John Rimmer & Son's Celebrated
Harness and other Needles.**

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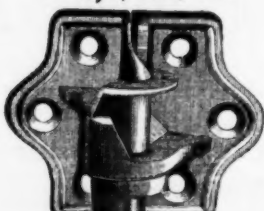
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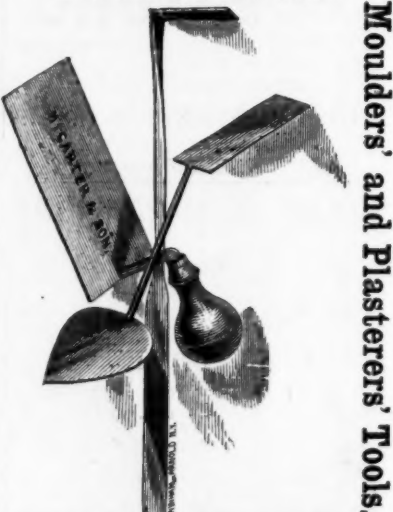


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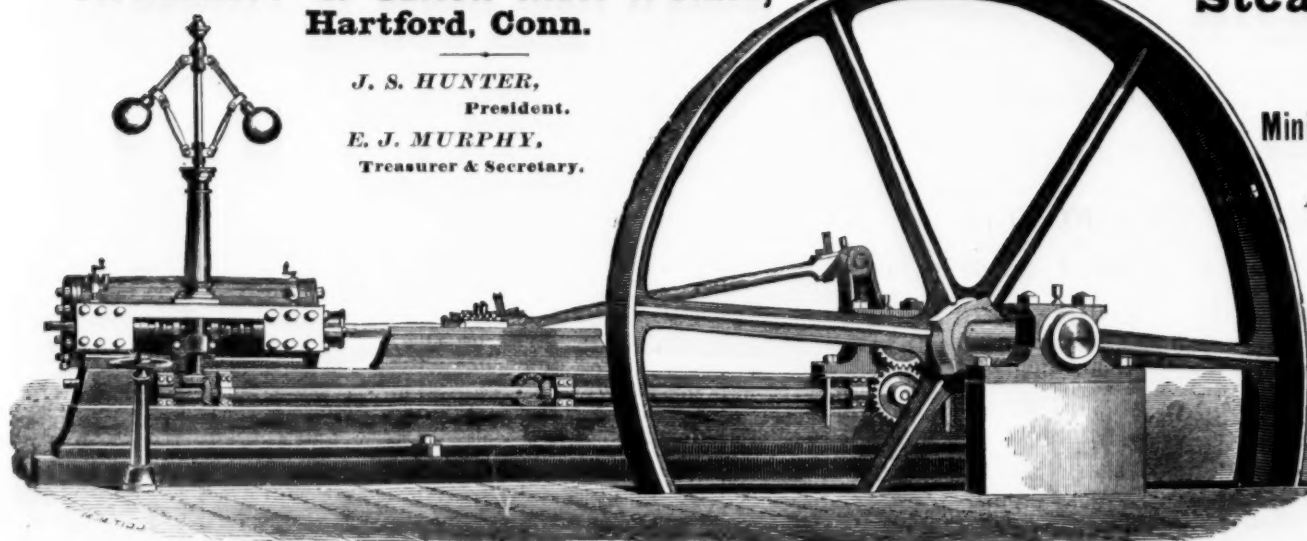
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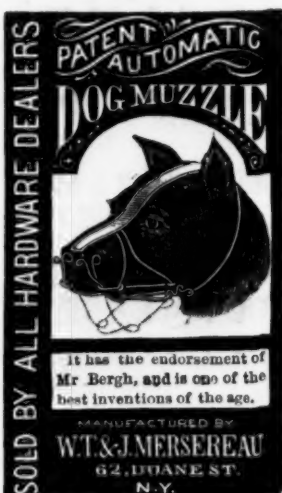
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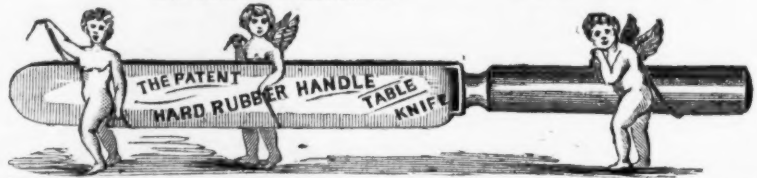
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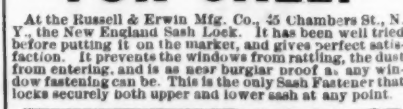
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The Eddy Patent Valve.

We present herewith some illustrations of the Eddy patent valve for use in steam, gas, water, air pipes, etc., or in any place where valves or gates are needed. These valves are made by the Mohawk & Hudson Manufacturing Company of Waterford, N. Y. (just above Troy on the Mohawk and Hudson Rivers) under letters patent issued July 1, 1873. These are double gate valves (like many others) but different in the way the gates are moved, and the

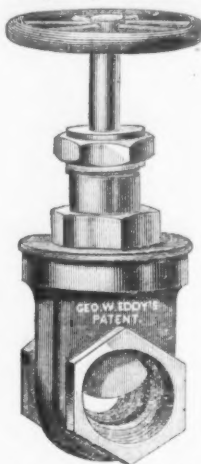


Fig. 1.—ELEVATION OF IRON VALVE—BRASS MOUNTED, SCREW ENDS.

pressure brought upon them in opposition to the water or steam.

Upon the stem of the valve (as shown in Fig. 2) is a nut of irregular form, having the lower part somewhat like a ball, upon which are small bosses, or trunnions, which project into corresponding cavities in the back of the gates. Upon these trunnions, which do not reach to the base of the cavity in the gate, the

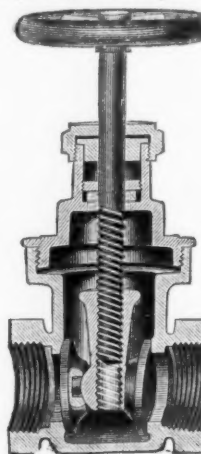


Fig. 2.—SECTION OF IRON VALVE, BRASS MOUNTED, SCREW ENDS.

latter is free to revolve; thus presenting itself in different positions, and, when wear begins, making it more uniform than when a gate always seats in the same position. As the nut on the stem rises and falls, the gates move with it, and, as the seats are somewhat inclined toward each other, they are at once relieved of pressure, and move very easily.

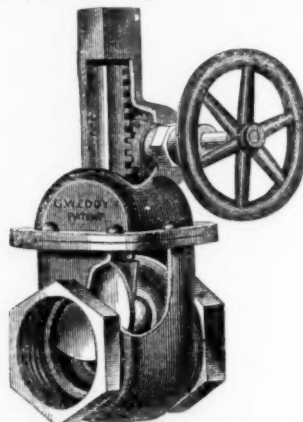


Fig. 3.—ALL BRASS SLIDING VALVE FOR QUICK OPENING.

In order to prevent the current of water, etc., from causing the upper part of the gate to incline too far out and rub against the case, the large sizes, 4 inch and upward, have a hook arrangement, not shown in the cuts, which allow sufficient motion for self-adjustment to the seats, but prevent too much; and as these

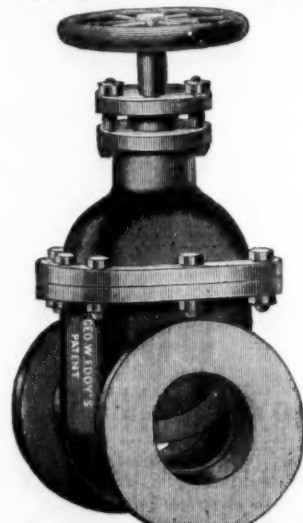


Fig. 4.—ELEVATION OF BRASS MOUNTED IRON VALVE, FLANGED.

books fit loosely in grooves in the gates, the latter are free to revolve.

When the gates are lowered and the valve closed, the ball part of the nut presses upon the rounded cavity surrounding the deeper cavity into which the trunnion enters, and this pressure is uniformly transmitted to all points upon the circumference of the gate. As stated before, this pressure is not upon the center, but a little outside of it; and from the shape of the gate, there is no possibility of its springing at any point. All are proved at high pressure, generally 300 lbs. per square inch. These valves are regarded with great favor by those who have used them, and possess the elements of a wide and permanent popularity.

In addition to the regular styles of valves, the company make a quick opening valve, Fig. 3, which is coming into use to a considerable extent. It is well adapted for a blast valve at

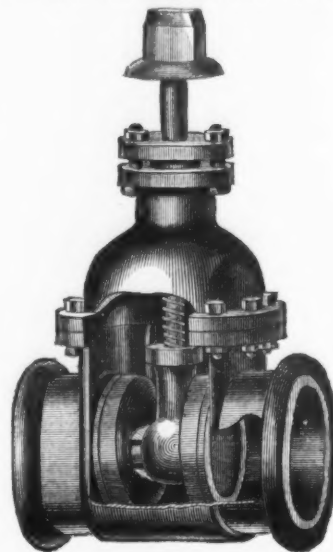


Fig. 5.—IRON VALVE, BRASS MOUNTED, HUB ENDS FOR GAS AND WATER MAINS.

iron furnaces, for it is so tight that no gas can pass it when closed, and furnace men would do well to examine it.

These valves are made of all sizes and styles—brass, iron, &c., with flange, hub or screw ends. The same company also manufacture fire hydrants of their own and the Bailey styles.

A Kentucky Railroad.

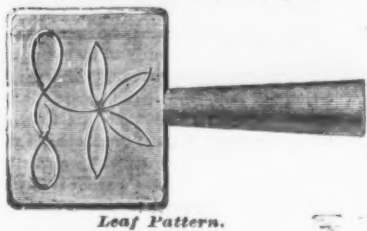
The Chattanooga Commercial has the following: The Cincinnati Commercial has scolded a good deal about the trustees of the Cincinnati Southern Railway building a road "parallel with the Kentucky Central," from Covington to Lexington, instead of buying that line. To have built a "parallel" road would have been an achievement in engineering beyond the powers of even the conception of Lovett and Gunn, and their whole corps of engineers. Consider the undertaking of laying down lines parallel with those which compose Spitzer's signature, and the reader will have a faint idea of the difficulty. The Southern line is a little more than 21 miles shorter than the Central, from Covington to Lexington, and the Central is but a hundred miles long. From end to end it is a system of double back action patent reverse curves; and the greatest triumph of railroad skill ever known is displayed on it daily in running first-class passenger trains at the enormous speed of 13 to 15 miles an hour. It used to be a standing joke among the soldiers that they could jump off the Central cars, pick a fill of blackberries, and cut across the country and get on again. An inquirer, who has figured carefully through the problem, informs the Cincinnati Trade List, "that the extra cost of operating the Kentucky Central for 20 years, considering none of its notorious defects, but the extra and unnecessary length, will exceed the total cost of the construction of the Cincinnati Southern from Lexington to Covington." So far as the course of the Central line goes, Licking River engineered it; and that river is crookeder than a ram's horn. The road follows the meanderings of the river to Paris, and there the river runs out, or into the ground, we don't know just which. So the able engineer, having lost his guide, made a bold original dash off to the West, and failed to get as many curves in his last 20 miles, for the reason that he had no crooked river to model them by. But he did run round several small hills, cow pastures and barns; and even this short section of the Central very fairly vindicates his skill in going the longest way to reach an objective point.

Belgian Coke Ovens for the Vinton Furnace.

Messrs. Bradford & Rader, proprietors of the Vinton Furnace, in the Hanging Rock district, Ohio, are putting in a Bradford separator and Belgian ovens, with a view to coking their own coals. Should the experiment be successful, it will cause great changes in the iron trade of the Hanging Rock region, as timber suitable for charcoal is becoming scarce, and the whole region abounds with bituminous coal hitherto unused in the furnaces, owing to the amount of sulphur contained in it and the difficulty of cementing it in coking. Before ordering the improvements, Messrs. Bancroft & Rader sent a lot of their coal—the run of the mine—to the Cambria Works, at Johnstown, where the Belgian ovens of Messrs. McLanahan, Stone & Bailey are in operation. Here it was made into a coke said to equal in quality to the best Connellsville. If this is true, there is no doubt of the success of the experiment at the Vinton Furnace, which has hitherto made iron with Connellsville coke as good as hot blast charcoal. The ovens will be in operation in October next, and the result is awaited with great interest by the furnace and coal land owners of the region.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



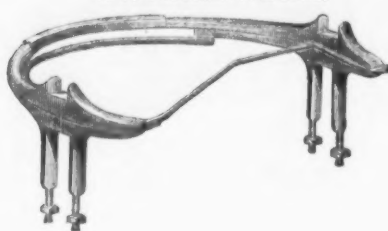
Leaf Pattern.

King Bolt Yokes.

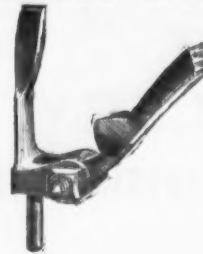


Established 1850.

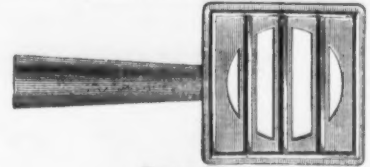
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

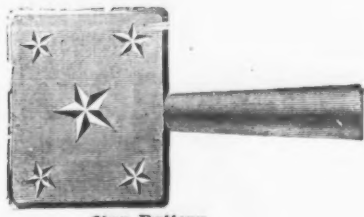
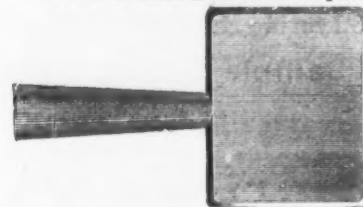


Upper View.



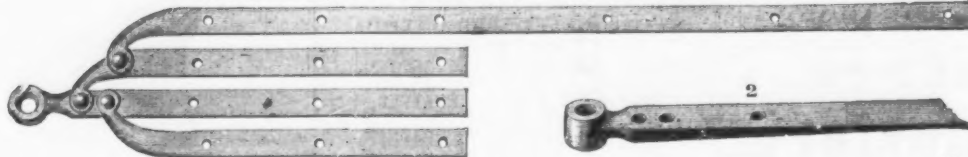
Lower View.

Solid Plain Pattern Steps.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



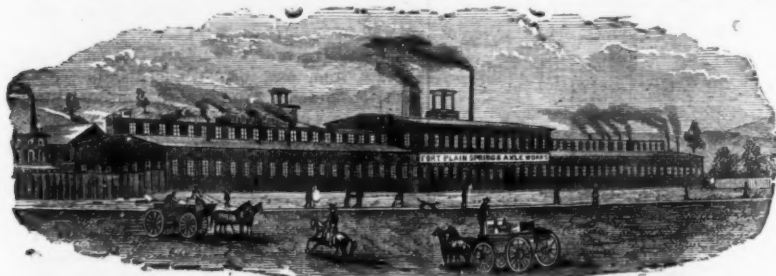
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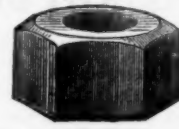
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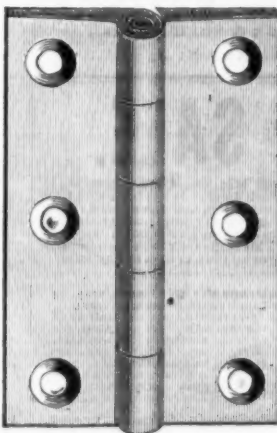
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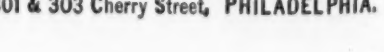
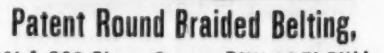
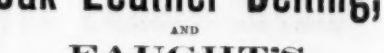
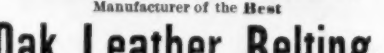
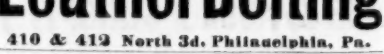
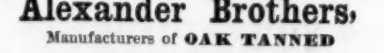
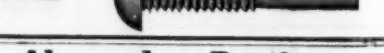
PATENT IMPROVED STEAM TRAP

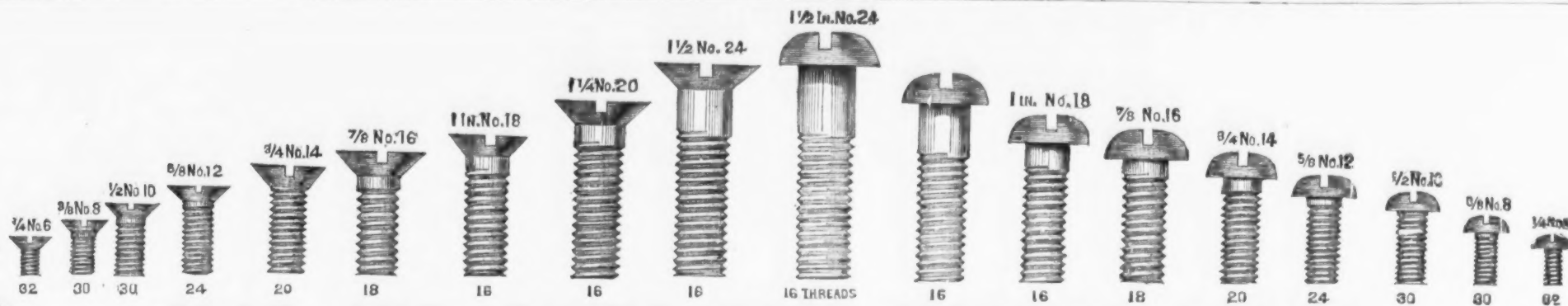
The only self-regulating Steam Trap in the world.

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The Iron Age.

New York, Thursday, August 12, 1875.

DAVID WILLIAMS - Publisher and Proprietor.
JAMES C. BAYLES - Editor.
JOHN S. KING - Business Manager.

New York, January 2, 1875.
Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents. Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

Our rates of subscription will therefore be as follows:

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Issued every THURSDAY Morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.
Semi-Monthly Edition.....\$2.30 a year.
Issued the FIRST and THIRD THURSDAY of every month. Contains a full Review of the Trade for the previous half month.
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Germany.....	6.08	3.04	1.52
Prussia.....	6.08	3.04	1.52
Buenos Ayres.....	8.16	4.08	2.04
Peru.....	6.08	3.04	1.52
Belgium.....	6.08	3.04	1.52
Mexico.....	8.16	4.08	2.04
Sweden.....	6.08	3.04	1.52
New Zealand.....	8.16	4.08	2.04
Brazil.....	8.16	4.08	2.04

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The Care of Tools.

Before the manufacture of tools of all kinds became a distinct and extensive branch of business, it was necessary for mechanics in all trades to understand the art of making their own tools. In the old books on metal working much attention was given to this matter, and in the writings of famous artisans of the olden time—Benvenuto Cellini, for example—we find that the directions for the making of tools are as explicit and comprehensive as the directions for using them when made. In Cellini's description of his method of preparing thin metal plates for raised work, he diverges at each stage to tell his readers how to fashion the tools they must use, even to the details of sharpening. In the writings of the artisan monks of the middle ages, we find the same care displayed in

describing all but simplest tools in common use. Until the beginning of this century, and even within the memory of our oldest mechanics, the best artisans were pretty much always the best tool makers, and much of the excellence of their work was no doubt due, in some measure, to the superiority of their implements. With the development of the tool business, the mechanic was relieved almost wholly from the necessity of fabricating, or even devising, the implements of his craft. He can now buy better tools than he can make or have made for him; while the introduction of labor saving machinery into the tool factories has so lessened the cost of their products, and at the same time so improved their quality, that his cheapest and best source of supply is usually the nearest hardware store.

But the change which thus relieved the mechanic of the necessity of being a blacksmith, has not stopped there. The men who have devoted their lives to tool making have anticipated the wants of all classes of artisans to such an extent, and so improved the quality of tools, that in most instances the mechanic has all he can do to learn how to use them to the best advantage, and, what is equally important, to take proper care of them. Many of the tools in common use have assumed the character of machines. Among these may be included drills of various kinds, presses and dies, pipe cutters and threaders, lathe attachments which were formerly simple tools but which are now almost machines in themselves, punches, shears for iron and steel, and many other appliances which need not be specially mentioned. These are unquestionably great savers of labor, but they have also effected many hitherto impossible divisions of labor. In many trades common mechanics, with improved appliances and tools, can now produce work beyond the best skill of the master mechanics of the past generation, but these tools and appliances are costly, and they must be taken care of by men who are specially skilled in this branch of business. Were every mechanic now required to mend and keep in order the tools he uses, he would have little time for anything else. Even when required to keep a kit of simple hand tools in good condition, he loses much valuable time, and rarely does this part of his work well. To keep even a common tool in first-class order requires the skill of a first-class man, who not only knows all about steel, its temper, quality, etc., but is practically acquainted with the work which it is expected to perform.

From such opportunities of observation and experience as we have had, we conclude that it is always economical in shops where twenty men or upward are at work, to keep one man, or several men if necessary, whose business it is to look after the tools. This part of the work includes the sharpening of special tools, sharpening, repairing, and the general custody of such as are not in constant use. In small shops, where a man's whole time could not be advantageously employed in the tool department, equally good results are secured by giving the most competent man charge of the tools as part of his work. In most shops where this system is not adopted, putting tools in order is usually made the pretext for a great deal of "loafing" about the blacksmith shop and the grindstones. The writer was once connected with a large machine building establishment in this city, in which about 1200 men were employed. In this shop there was, practically, no system with regard to tools. When a man or boy wanted a recess he would gather up a handful of chisels and trot off to the blacksmith shop. While they were being sharpened, and often a good deal longer, he would walk about with his hands in his pockets, an interested spectator of what others were doing. Presently he would go after his chisels, but not return to work. They must be ground. At the stones there was usually half a dozen or more men waiting their turn, and, as none of them were in a hurry, a man with two or three chisels could usually employ half or three-quarters of an hour in pleasant and profitable conversation. New tools could be had for the asking, and nobody thought of using a file after the first sharp edge was gone, or of using any other tool longer than suited his convenience. The consequence was that every shop was littered up with half worn tools, which nobody would claim. Obviously, such a slipshod method as this is wholly wrong. The proper system gives the men who keep the tools in order charge of their distribution and return. They should have rooms to themselves, with windows opening into the shops with which they are connected. When a tool needs attention, they receive, sharpen or repair, and returns it to the workman by a boy. In the meantime, the workman having the dull or damaged tool receives a duplicate to work with, which

he gives up when his own tool is returned to him, or keeps in exchange, according to circumstances. All new tools which he receives are charged to him, and a corresponding credit is given when he returns them. Tools which are used only occasionally, such as jack screws, large wrenches, heavy hammers, and a great many other implements of which there is only one set for a shop, should always be charged to the man who receives them or the foreman in charge of the work on which they are used, and it should be the invariable rule that all such tools must be returned to the office. The advantages of this system are a saving in time, a saving in tools and the inculcation of habits of order and careful handling of tools. Where it is neglected, loss of time, an unnecessary wear and tear of tools, and the formation of careless and slovenly habits, are inevitable.

Bronze, Pewter and Tin.

Tin plate forms the principal material for the manufacture of the culinary utensils of all civilized countries. The tin cup, pan and pail are found in every house, from one end of the land to the other. Without tin vessels it would seem that the work of the housekeeper would, for the moment, be brought to a standstill. It will be both profitable and interesting to glance at the steps by which civilization has reached this abundant use of the so-called tin plate.

In the early ages of the world, the metal vessels for cooking were of copper or brass, many of them not unlike in shape those in use at the present day. Although iron was known to the ancients, it was a metal altogether too valuable to be used for such purposes; moreover, it was too difficult of manipulation. In Egypt, Greece and Rome alloys of copper were, as in more ancient days, used for the metal utensils of the kitchen. They were easily worked, and, above all, cheap, and when taken care of, were brilliant, a consideration by no means without its weight in those times. In the extreme East, bronze, brass and copper have been from time immemorial used for the manufacture of cooking vessels. The bronze was earlier used than the brass—tin and copper being known long before zinc was considered a useful metal. It is said that the first brass made was produced directly from the ore, the zinc and copper ores occurring in combination. Pliny speaks of making brass by a sort of cementation process. Much of the early work in brass, copper and bronze was cast, even when the metal was to be quite thin. Copper was, from the first, worked out under the hammer, on account of its great malleability. Beaten and cast work were also to be found combined in the same article. During the later times iron somewhat disputed the field with bronze and brass, but it was more difficult to work, and could not be ornamented with anything like the ease of brass or copper. In the early and middle ages the people were in little better condition than serfs, and what they used for cooking was of no account. The pot in which food was cooked served for dish and plate, while fingers answered for forks, knives and spoons. Lead had been known from early times, and was largely used for roofing, plumbing, and in various ways in the houses of the rich and in great buildings, and being much cheaper than bronze, was the first metal that was adopted for making kitchen ware for the common people, when they began to be sufficiently civilized to need such things. Taverns and public houses took the cheaper metal, and gradually there arose a demand for something less costly than the bronze. Lead, however, was too soft, and an alloy of tin and lead, or of tin and some of the harder metals, was found suitable for the manufacture of drinking vessels, platters and dishes generally. It was cheap, easily worked and abundant. When polished it was brilliant, and could be readily ornamented. It bore about the same relation to bronze that silver does to gold, and hence was just the metal for the time. As early as 1482 the pewterers were incorporated as the sixteenth company of the city of London. The general introduction of pewter as a metal for the common people may be said to characterize one of the great steps of the world's progress. Without this soft and tolerably strong metal the people would have been without dishes, except those of unglazed pottery. Cups, tankards, bowls, goblets, drinking cups, platters, mugs, inkstands, measures, teapots, and a thousand other articles of common use were made from pewter. Stone china was unknown, porcelain was for princes, and earthenware was so rough and poor as to be fit only for the commonest sorts of utensils. Pewter held its position until a comparatively recent date. The improvement in stone china and porcelain contracted its field of utility on one side, while the introduction of cheap and good cast iron ware, the general improvement of sheet

iron goods and, the introduction of silver plate, took away what remained. Then tin plate came into use and became the material of greatest utility. Pewter is not wholly driven out of use, for there is an extensive trade in it, and the manufacture of pewter and Britannia metal is an immense industry in England, but the use of articles made from these alloys is by no means general. Tin plate seems to answer in almost every respect the requirements of what may be called a popular metal. Light, strong, cheap, easily worked, and giving off no poisonous combinations, it supplies more wants than could be readily enumerated. Its faults are too rapid decay by the rusting of the iron or the dissolving of the tin by vegetable acids or by alkalis. The progress which has been made in the working of tin plate within the last twenty years is remarkable, and all the more so because unnoticed. In every tin shop in the land an observer with a good memory can find evidences of progress. The cheapest tin pail now sold is a better article than could have been bought for money twenty years ago. Trimmings which then each man made for himself, are now stamped out by power. Forms are improved, and in goods made at factories there was nothing in the old times to compare with them. They belong to an entirely new class, and in stamped, spun and planished ware made from tin plate it would seem as if there remained but little room for improvement. We have not, however, learned all that is to be known of the adaptability of tinned iron to common and special uses, and perfect as our products now seem, the progress of improvement is rapid and sustained. The place of tin and tinned iron in the economy of civilization seems to be a permanent one, and no metal which we now have in sufficient quantity has the qualities which must be possessed by the metal which shall supercede, or even actively compete with, tin and tin plate.

Position of the Tin Plate Markets.

Since the beginning of the current year there have been but moderate dealings in tin plates from importers' hands, speculators having wisely concluded to let them alone for the present. There has been a tolerably steady demand from consumers—sufficient to reduce the stocks in this market considerably below the averages of former years, and even this moderate stock is pretty much concentrated in one hand. From the interior we hear that only light stocks are held, which is quite probable, as the jobbers of Chicago and other Western markets have bought only about one-quarter of their usual requirements. In a less degree, this is also true of the Eastern and Middle States.

There seems no probability of an immediate change in the conditions affecting this branch of the metal trade. The market for tin plates is dull, but by no means stagnant. Notwithstanding our increased importations from England, the consumptive demand has been sufficiently active to prevent any accumulations in importers' hands, and this fact shows a more general activity in the trades using tin plates than was commonly supposed. For plates suitable for the manufacture of household utensils, the demand has been less this season than in former years; also for roofing plates. For other kinds and qualities the demand is just now unusually large. The manufacture of cans for fruits, vegetables and meats consumes immense quantities, and the requirements of the lard, petroleum and paint trades are steadily increasing.

The following shows the export of British tin plates during the six months ended with June last:

	1875.	1874.	1873.
To the United States.....	52,323	49,717	49,645
To other countries.....	19,807	13,817	17,198
	2,199	63,594	66,843

of which in June there were sent to the

	1875.	1874.	1873.
United States.....	9,605	8,769	5,108
Other countries.....	4,175	1,819	2,693
	13,780	10,588	7,801

The following has been England's export in boxes for three years ended with 1874:

To	1874.	1873.	1872.
United States.....	1,585,994	1,511,632	1,531,356
Holland, Germany and Belgium.....	96,313	63,647	83,902
Australia and New Zealand.....	42,394	76,890	92,565
Italy & Mediterranean.....	72,920	114,699	75,086
Canada.....	66,188	69,318	72,526
France and Switzerland.....	40,318	71,589	59,973
South America & Brazil.....	51,079	80,852	50,993
Spain and Portugal.....	54,013	64,041	48,510
Norway, Sweden and Baltic.....	71,525	67,639	48,555
India and China.....	44,639	42,515	14,506
West Indies.....	5,953	8,434	6,292
Cape, Ceylon and Mauritius.....	3,111	7,964	5,293
Africa.....	4,169	3,038	2,288
Other countries.....	1,750	1,199	286
	3,143,468	3,153,477	3,083,451

The foregoing shows that the general decrease last year over 1873 was about 10,000 boxes, but that our increase was about 75,000 boxes. This year's movement exhibits an increase thus far of 2606 tons to the United States.

In spite of the steady augmentation of

export from England, prices there have experienced a severe decline, as will appear from the following comparison:

	July 1, 1875.	July 1, 1874.
L. C. Coke, ordinary brands.....	22 0 to 22 6	28 0 to 30 0
L. C. Coke, best brands.....	24 0 to 25 6	31 0 to 33 0
L. C. Charcoal, ord. brands.....	26 0 to 27 0	36 0 to 37 0
L. C. Charcoal, best brands.....	30 0 to 32 0	40 0 to 42 0

New York Prices: Ordinary Brands.

	July 1, 1875.	July 1, 1874.
Gold, per box.....	\$8 25 to \$8 50	\$10 25 to \$10 50
Gold, per box.....	\$10 25 to \$10 50	\$12 25 to \$12 50
Gold, per box.....	\$12 25 to \$12 50	\$14 25 to \$14 50
Gold, per box.....	\$14 25 to \$14 50	\$16 25 to \$16 50
Gold, per box.....	\$16 25 to \$16 50	\$18 25 to \$18 50
Gold, per box.....	\$18 25 to \$18 50	\$20 25 to \$20 50
Gold, per box.....	\$20 25 to \$20 50	\$22 25 to \$22 50
Gold, per box.....	\$22 25 to \$22 50	\$24 25 to \$24 50
Gold, per box.....	\$24 25 to \$24 50	\$26 25 to \$26 50
Gold, per box.....	\$26 25 to \$26 50	\$28 25 to \$28 50
Gold, per box.....	\$28 25 to \$28 50	\$30 25 to \$30 50
Gold, per box.....	\$30 25 to \$30 50	\$32 25 to \$32 50
Gold, per box.....	\$32 25 to \$32 50	\$34 25 to \$34 50
Gold, per box.....	\$34 25 to \$34 50	\$36 25 to \$36 50
Gold, per box.....	\$36 25 to \$36 50	\$38 25 to \$38 50
Gold, per box.....	\$38 25 to \$38 50	\$40 25 to \$40 50
Gold, per box.....	\$40 25 to \$40 50	\$42 25 to \$42 50
Gold, per box.....	\$42 25 to \$42 50	\$44 25 to \$44 50
Gold, per box.....	\$44 25 to \$44 50	\$46 25 to \$46 50
Gold, per box.....	\$46 25 to \$46 50	\$48 25 to \$48 50
Gold, per box.....	\$48 25 to \$48 50	\$50 25 to \$50 50
Gold, per box.....	\$50 25 to \$50 50	\$52 25 to \$52 50
Gold, per box.....	\$52 25 to \$52 50	\$54 25 to \$54 50
Gold, per box.....	\$54 25 to \$54 50	\$56 25 to \$56 50
Gold, per box.....	\$56 25 to \$56 50	\$58 25 to \$58 50
Gold, per box.....	\$58 25 to \$58 50	\$60 25 to \$60 50
Gold, per box.....	\$60 25 to \$60 50	\$62 25 to \$62 50
Gold, per box.....	\$62 25 to \$62 50	\$64 25 to \$64 50
Gold, per box.....	\$64 25 to \$64 50	\$66 25 to \$66 50
Gold, per box.....	\$66 25 to \$66 50	\$68 25 to \$68 50
Gold, per box.....	\$68 25 to \$68 50	\$70 25 to \$70 50
Gold, per box.....	\$70 25 to \$70 50	\$72 25 to \$72 50
Gold, per box.....	\$72 25 to \$72 50	\$74 25 to \$74 50
Gold, per box.....	\$74 25 to \$74 50	\$76 25 to \$76 50
Gold, per box.....	\$76 25 to \$76 50	\$78 25 to \$78 50
Gold, per box.....	\$78 25 to \$78 50	\$80 25 to \$80 50
Gold, per box.....	\$80 25 to \$80 50	\$82 25 to \$82 50
Gold, per box.....	\$82 25 to \$82 50	\$84 25 to \$84 50
Gold, per box.....	\$84 25 to \$84 50	\$86 25 to \$86 50
Gold, per box.....	\$86 25 to \$86 50	\$88 25 to \$88 50
Gold, per box.....	\$88 25 to \$88 50	\$90 25 to \$90 50
Gold, per box.....	\$90 25 to \$90 50	\$92 25 to \$92 50
Gold, per box.....	\$92 25 to \$92 50	\$94 25 to \$94 50
Gold, per box.....	\$94 25 to \$94 50	\$96 25 to \$96 50
Gold, per box.....	\$96 25 to \$96 50	\$98 25 to \$98 50
Gold, per box.....	\$98 25 to \$98 50	\$100 25 to \$100 50

While the English decline had been 24 per cent., the American, till then, was but 15 per cent. But in July prices here declined another 25c. per box.

The decline in tin has, of course, assisted in bringing about the depreciation in plates, but the general stagnation of trade in Europe, and, to some extent, here and elsewhere, has also affected the manufactured article.

We take the following passage from the latest general tin plate report to hand from London, dated July 21: "Present prices of plates have attracted a fair amount of attention from the Continent, and at current figures the requirements of this quarter have, to a great extent, been already contracted for. On the average the works have probably from a month to six weeks' work still to execute, after which, unless the demand for the fall trade expands to a greater extent than there are at present any signs of, they will have to seek further engagements, and prices will probably recede slightly in consequence. Although low prices invariably increase consumption, the process of expansion is always a slow one, and low prices must be current for some time before their effect is fully felt. There is at present rather a disposition, on the part of members to hold off the market in anticipation of better figures than are now obtainable." The condition of the local market for plates is so fully described in our trade report, that no further comments are needed here.

English Cooking and English Stoves.

Just now there seems to be a good deal of interest felt in England in the matter of reform in cooking, and the people in that country are moving in the matter in their usual stolid, respectable way. The recent annual meeting of the National Training School of Cookery was held at Stafford House, the residence of the Duke of Sutherland, and was well attended by "the nobility and gentry." The Princess Louise was there, though we don't suppose she knows or cares much about cooking, and the Duke of Westminster took the chair. The secretary's report showed that the school had been in operation since March, 1874; 765 pupils have passed through it, of whom 108 have presented themselves for examination and have obtained "learners' certificates." Three have obtained full diplomas as teachers and remunerative employment. In addition to the work of this particular training school, cooking is now taught in elementary schools, and the Committee of Council of Education have ordained that every girls' school wherein the pupils pass an examination in "food and its preparation" and in "clothing and materials" will receive an addition to its annual grant. In the training colleges also throughout the country the practical teaching of cookery will now, to the extent of two-thirds, be paid by the state.

We don't like to criticise our neighbors' doings, but it seems to us that the first step in the direction of cooking reform might be taken advantageously in the radical improvement of English cook stoves. Such remarkable contrivances as are sold in the English market as cook stoves would throw an American housekeeper into violent hysterics, and frighten her children into convulsions. They make very pretty grates and fire-place heaters—which is not to be wondered at when we consider how they make them, as described in another column—but when it comes to cook stoves, they have much to learn from our American founders. Give her one of our stoves, a supply of raw materials and a bucket of coals, and we would wager considerable that an English girl would learn how to do good cooking without being taught at the expense of the national treasury. At the same time, cooking reform is a good thing, and we should be glad to see some system by which the servant class in this country could be taught its higher branches.

We are informed that an iron merchant in St. Louis is furnishing Bessemer pig, made in Central Missouri, to the Pennsylvania Steel Works at Harrisburg, and that the same enterprising dealer has furnished similar iron to the works at Bethlehem. Mr. Gowan, in his argument before the Legislative Committee, employs his fine oratorical powers to prove that the policy adopted in the management of the Reading Railroad Company is the proper one, but facts like these overturn the most logical arguments. Unless less cheaper fuel and freights are given the Pennsylvania, New Jersey and New York furnaces, it will continue profitable to bring from Missouri Bessemer pig iron which could as well be made within sight of the works using them. The iron masters owning furnaces along the line of the Reading Road, if they dare say what they think, could give some interesting facts to the committee now investigating the management of that company.

We print on the opposite page the first part of a very full abstract of Prof. Henry Wurtz's report on a new process of making iron with petroleum, for which we are indebted to the author. The subject is one of great interest to a very large class of our readers, and we believe it has never before been so fully or intelligently discussed.

Report upon the Eames System of Furnace Working with Petroleum.

BY PROFESSOR HENRY WURTZ.

Having been called on to examine and report upon the novelty, the principles, and the value of the system of Dr. C. J. Eames of obtaining from crude petroleum simultaneously both the heat and the power needed for metallurgical operations upon iron, I have made several visits to his furnace, as operating in Jersey City, and examined critically the work there carried on, of piling and reheating waste scrap iron, and rolling it into boiler plate; and have now the honor to report my observations and conclusions. In so doing, it is proper to say that this present report is not intended to cover all the scientific questions that arise out of the new system of firing furnaces and making steam with petroleum, some of which remain yet to be fully worked out; but that I propose to restrict myself mainly to those points which are of immediate import to practical men.

NOVELTY OF THE METHOD AND APPARATUS.
The cuts, Figs. 1 and 2, represent an ordinary reheating furnace for iron, such as the experiments were made with in Jersey City; the form being by no means the best for developing the full merits of the new system, but answering tolerably well for the experiments made. Figure 1 is an external and Fig. 2 a sectional view. In Fig. 2, letters A B C D indicate the Eames vapor generator, called simply the "generator," the main feature of the new apparatus and process. A is a cast iron vessel, with horizontal shelves projecting alternately from opposite sides, over which shelves the oil, entering at D, at the average rate—for this one furnace, when heating 3000 lbs. of iron at a charge, and making steam for the rolls beside—of 30 gallons or 200 lbs., as a maximum per hour, flows downward in a thin layer, dripping from shelf to shelf. It thus meets a slow opposing current of steam heated to incandescence, and kept at a pressure of about 10 lbs. per inch, and which passes upward from the super-heating coil B, enclosing the fire. Every trace of oil is taken up, and swept on to a mixing chamber which occupies the former fire space, where it meets the air blast entering at the point E (the former ash pit.) It will be observed that the former "bridge-wall" of the furnace is built up solid to the crown, except the space H G, called the "combustion chamber," an important and essential part of the Eames inventions. This consists simply of a cellular tier of fire bricks placed on end, extending all across over the old bridge wall. Within these cells the combustion takes place, and it is found that if this combustion space has a horizontal thickness of more than 18 inches, the fire bricks fuse down. It is intended to represent one of the piles of scrap iron, with its top and bottom "covers," of which, however, six, averaging 500 lbs. each, are introduced at a charge, in regular working. The course of the flame, under and back through, one of the flues of the boiler above and thence into the stack, is sufficiently indicated by the arrows. This apparatus is covered by a series of patents, that for the generator being No. 132,366, of date Oct. 15, 1872.

CHEMICAL PROPERTIES OF PETROLEUM.
A slight discussion of the chemical and physical nature and properties of our American petroleum will be a highly useful introduction to a practical discussion of this new process of utilizing it. Crude Pennsylvania petroleum is a mixture of a large number of compounds of carbon and hydrogen, of densities boiling points, etc., varying among each other through a very wide range. According to one of our first authorities in the study of petroleum, Dr. Vander Weyde, these different compounds, when once separated from each other, boil at temperatures ranging from that of ice up to 700° Fahr., or higher. Its average density is about 45° Beaume, corresponding to a gravity of 800, water being 1000. Thus U. S. gallon of water weighing 8.333 lbs., avoirdupois, a gallon of average crude petroleum weighs 6.67 lbs. Its composition is about as follows:

Carbon.....	84
Hydrogen.....	14
Oxygen.....	2
	100

The average latent heat of the vapor of petroleum has not been very satisfactorily determined, but it is known to be very low. Dr. Ure states it at 184, that of steam being 1000, of alcohol vapor 457, and of ether vapor 313. That is, an amount of heat that will vaporize but 1 lb. of water, and about 2-2 lbs. alcohol, will vaporize 5-4 lbs. of petroleum (assuming no important change of specific heat during the change of state). By measure, the amount of heat or fuel that will vaporize 1 gallon of water should vaporize no less than 6½ gallons of petroleum. This is an important practical point in this connection. The density of its vapor is very high, averaging, if the whole mass be converted into vapor, six and a half times the density of air at the same temperature. At 500° Fahr. it will all pass into vapor form, except a trifling percentage, and as at that temperature air will weigh per cubic foot

$$\frac{565 \times 492}{500 \times 60 + 492} = 298.26 \text{ grains}$$

(565 grains being the weight of the cubic foot of air at 60°, and 1-492 its coefficient of dilatation for the Fahrenheit degree), then—if we admit for it the same coefficient of dilatation as for air—petroleum vapor at 500° weighs 1939 grains per cubic foot, and one gallon of petroleum should yield only 24-08 cubic feet of vapor of that temperature.

The specific heat of liquid petroleum is stated to be .4654, that of water being 1. The specific heat of its vapor does not seem to have been determined, but it probably will not greatly differ from that of the liquid. When boiled down, a tarry residue is always left, which, on raising the heat, chars and leaves a coke like mass behind. This becomes, also, in such cases as we have under consideration, a highly important matter.

CALORIFICS OF PETROLEUM.
The heating power of Pennsylvania petroleum has been determined with sufficient accuracy for all practical purposes. For oil from Oil Creek, H. Sainte Claire Deville, experimenting for the French government in 1869, found a total calorific power of 9963 Centigrade units, equal to an evaporation of 16-17 lbs. of steam per lb. of oil; and his actually obtained yield of steam was 14-05 lbs. per lb. of oil; 1252 heat units out of the 9963, by exact measurement, being lost in operating the chimney to produce draught, and 76 units by radiation—in all, 1328, or 13-33 per cent. of the whole.

Another Pennsylvania oil, from Franklin, on French Creek, of higher density (*Huile lourde*), gave him 10,673 units in all; and Ohio oil, dense and black, gave 10,399. The first sample, from Oil Creek, doubtless represents about the average of the crude oil of commerce, and is hence adopted by me as a basis for calculation. As the total heat of complete combustion of carbon as charcoal—according to the mean of the figures of Andrews and of Favre and Silbermann—is 7900 units per lb.; Pennsylvania oil, therefore, may be practically rated as having just 25 per cent. more heat in it per lb.

than (chemically pure and perfectly anhydrous) wood charcoal; or (supposing ash and condensed gases present equivalent to ten per cent. loss) 40 per cent. more than common charcoal. The theoretical powers of the best British coals per lb. are estimated to be between 14 and 15 lbs. of steam; but the British Admiralty, in a long extended and elaborate series of experiments, found that the best actual result from the best steam coals was 9-5 lbs. of steam per lb.; and not more than eight pounds with ordinary coals. Experiments, by what was called the Dorset system, of making steam with heavy oils from Boghead mineral, were made at Woolwich in 1866-7, during 18 months. Steam jets (not super-heated) were here used to convey these oils; 15 lbs. of steam were made on an average per lb. of oil. The accounts show great general imperfection of operation and of combustion, with large production of soot and smoke; but the maximum result, when the combustion, as we may believe, was exceptionally perfect, was 17-5 lbs. of steam per lb. of oil, which was even above the full theoretical value of the oil! With perfect combustion and skilled handling, we may safely adopt, as the actual steam value of our petroleum, fifteen lbs. of water made in steam by one pound of oil—equal to just 100 lbs. of water per gallon; 4400 lbs. per barrel, or 528 gallons of water vaporized by one barrel of oil, from 212° Fahrenheit. The maximum of 17-5 lbs., of the Woolwich experiments above, may be, in part, explained by a somewhat greater inherent calorific capacity of the Boghead oil over petroleum [Capt. J. H. Selwyn, who reported the Woolwich results, pointed out, as inexplicable, that this figure went clear beyond the total absolute calorific capacity of the material, estimated by the usual rules. I call attention to this, to introduce the true ex-

planation of this fact, which, so far as I can learn, has never been given before. Carbon, like everything else, has a latent heat of fusion or of liquidity, though the amount of this is yet unknown. It seems probable that it is large in amount. In case of oil fuel, we are clearly dealing with liquid or fused carbon, which, according to this view, would yield us more effective heat for equal weights than solid carbon in coal. This has been overlooked in the accepted modes of estimating the calorific effectiveness of liquid fuels, and they must have been underestimated accordingly.]

We must not rest satisfied, however, in the case we have in hand, with a valuation of the steam making power only of our oil fuel. In metallurgical work—certainly in Siderurgy—other considerations enter, of which it is very important we should gain a clear idea and appreciation. Above all things we need, in these cases, concentrated heat. This, indeed, has been the undoubted reason why many intelligent practical iron men have looked askant, and with no inexcusable incredulity, upon the use of oil in Siderurgy. Their very natural supposition has been that for producing concentrated heat solid fuel was most suitable. Hence, I would here enter upon some slight considerations belonging to the chemistry of flame. Seventeen years ago, at a meeting in Baltimore of the American Association, in 1858, I presented a view, then so novel and having so little obvious practical bearing, that it has obtained no attention, but which now comes up with such direct and weighty practical application, that I shall be excused for reproducing the passage. The subject under investigation was the Flame of the Blowpipe. The passage is as follows:

"An ordinary alcohol flame gives, with the blowpipe, a comparatively feeble heat. A gas flame is much superior, and a large wax candle gives probably a higher heat than anything else in common use. It occurred to me that the heating effect was dependent on the density of the burning vapor, or the quantity of combustible matter contained in the same volume. I therefore sought for combustibles having a higher density of vapor, and found that the paraffine of Reichenbach, now known from the investigations of Hofstadter and Filippi to be a mixture of different hydrocarbons, was found by Levy to have a vapor density of not less than 11-8. By inquiry I found that candles composed of this or similar material, obtained from the products of the distillation of the

'Breckinridge coal,' could be bought in New York. On procuring some of these and using them with the blowpipe I found that their flame was much hotter than that of the wax candle."

It will be scarcely necessary to add that I connect the intensity and concentration of the heat of the oil flame with the great density of the oil vapor, that I have above pointed out, and that I liken the flame of the Eames furnace, with unquestionable accuracy, to that of a blowpipe. In the case of coal fires, including those with the so-called "gas generators," as doubtless all will readily comprehend, the flame which is directed upon the hearth is essentially a flame of carbonic oxide gas, a gas whose density is just that of atmospheric air. Moreover, this carbonic oxide is already diluted with the nitrogen (equal to twice its own volume) of the air that has served to burn the carbon to carbonic oxide; so that, compared with the oil vapor, far less combustible matter is contained in the same space, and if the oil vapor were pure carbon vapor, the difference in temperature might be very great. Much hydrogen, however, is present to form water in its combustion, which takes up heat, as latent heat of steam; and to compare the theoretical temperatures of the flames requires quite complex calculations, that cannot be here entered into. If exactly the right amount of air for complete combustion could be introduced in the two cases, there would really be a small difference in the final resultant temperature of the fully expanded products of combustion in favor of the carbonic oxide (that is, comparing, I mean, a pound of carbonic oxide with a pound of oil). A vast difference is, nevertheless, actually found in practice, as in the experiments above with the blow-pipe on paraffine

obstruction of the tubes by deposition of solid carbon:

"Isherwood states the advantages of the use of mineral oils, in his experiments, as follows:

- "1. A reduction of the weight of fuel, amounting to 40-5 per cent.
- "2. A reduction in bulk of 36-5 per cent.
- "3. A reduction in the number of stokers in the proportion of four to one.
- "4. Prompt kindling of fires, and, consequently, the early attainment of the maximum temperature of furnace.
- "5. The fire can, at any moment, be instantaneously extinguished.

"Other advantages, not here mentioned by Isherwood, are the uniformity of combustion and of heating attainable, and the absence of ash."

Further on, under "Gaseous Fuel," Prof. Thurston remarks:

"The advantages possessed by gaseous fuel are:

- "1. Convenience of management of temperature.
- "2. Freedom from liability to injure material with which the products of combustion may come in contact.
- "3. The facility with which thorough combustion may be secured.
- "4. The readiness with which the flame may be given either an oxidizing or a deoxidizing character."

In another place he says:

"The maximum temperature attainable in furnaces burning gaseous or vaporous fuels, when properly proportioned, is usually only limited practically by the heat resisting power of the furnace walls."

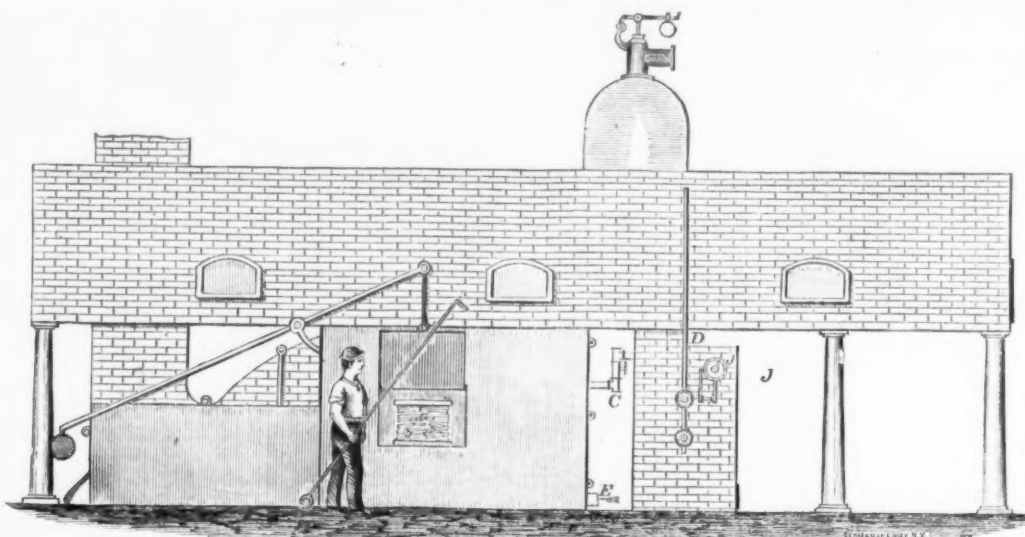


Fig. 1.

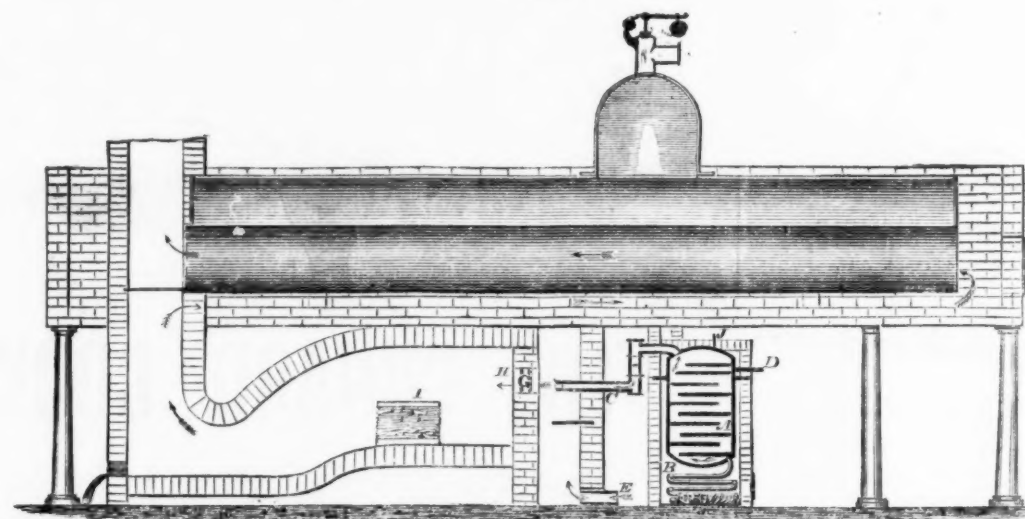


Fig. 2.—FURNACE FOR THE EAMES PETROLEUM IRON PROCESS.

BRITISH OPINIONS ON OIL METALLURGY.

A late editorial review of this general subject, in one of the most sterling of the great British technical journals, *Iron*, says, referring to the experiments at Woolwich and the Chatham Dock yard, together with those made in France with locomotives:

"It is to be remembered that the fact of soot being produced in notable quantity is conclusive evidence of imperfect combustion, and, therefore, of bad arrangements. We all know the difference between a lamp so ill-constructed as to have a bad supply of air with a necessarily smoky and wasteful flame, and another which, receiving an adequate stream of oxygen, burns without a particle of smoke. Just so with a furnace. Again, a steam jet is the worst possible means of promoting the combustion of the oil, as it must necessarily abstract a considerable portion of heat from the flame, and yet give no aid to combustion, other than by scattering the liquid into a spray. If used at all, the steam should be super-heated at about 1000° C."

This latter is precisely what is done in the Eames system.

Further, in reference to metallurgical applications, specially:

"Professor Rankine, who devoted considerable attention to this subject, was definitely of opinion that nine-tenths of the theoretical efficiency might be looked for with hydro-carbon liquids as fuel. With a coal burning furnace it is requisite to pass at least double the quantity of air through the grate that would suffice for the chemical requirements of combustion, the surplus carrying to waste about 1300 heat units; yet even with this enormous volume of air perfect combustion is not attained."

Further on:

"The obvious advantage of a system which would allow of fuel being consumed with the aid of but a trifle more than the bulk of air sufficient to yield the oxygen required for the chemical exigencies of combustion, need hardly be insisted on. It would afford, on a large scale, the results which on a small one are yielded by the Bunsen burner; in fact, it would be impossible to devise conditions more favorable to complete combustion with a minimum of air. Add to this that oil has no ash, and that we have not the absorption of heat due to this cause, and as we have here to deal with very high temperatures, the proportional saving resulting from a limitation of the air supply, combined with perfect combustion, would be far greater than in steam raising, while the margin for economy, even with regenerative furnaces, is enormous."

SOME FURTHER CHEMICAL POINTS.

In the 24-08 cubic feet of vapor, shown to be formed from a gallon of petroleum, there are, deducting the hydrogen corresponding to the two per cent. of oxygen, 5-663 lbs. carbon which require 14-941 lbs. oxygen, and 0-923 lbs. hydrogen, which requires 7-336 lbs. oxygen for complete combustion to carbonic acid and water; in all 22-277 lbs. oxygen, equivalent to 1208 cubic feet of air. Each cubic foot of the petroleum vapor, at 500°, requires, therefore, for complete and smokeless combustion, not less than 52-6 cubic feet of air at 60°, which latter must moreover be mingled with it perfectly and uniformly. Below this proportion it is certain that a flame may result more or less fuliginous. Hence we learn two things—the necessity of an enormous supply of air to this furnace, and that this air must be injected with rapidity, and caused to move in currents as sinuous as practicable, to promote rapid and complete mixture with the combustible vapors. Thirty gallons of oil per hour may be stated as a practical consumption for one of these reheating furnaces, with a charge of 3000 lbs. iron. This requires, for complete combustion, a minimum blast of 38,040 cubic feet of air per hour, or 10½ feet per second. As some excess of air, however, is always necessary, we may probably put the minimum at 12 cubic feet per second.

In the cases, hitherto, of experiments for steam making with oil fuel, the most frequent, indeed, I believe, universal trouble—the veritable *bête noire*—has been soot and smoke; things which, in the Eames system, appear to become so manageable, that in all my visits I have not yet witnessed a visible exhalation of smoke from the stack of the furnace. It is doubtless due to this cleanness and purity of the flame that so large a proportion of the heat is abstracted from the products of combustion by the boiler, that when 30 gallons of oil per hour were burning in the furnace, and the temperature on the hearth ranged at 300° Fahrenheit and upward, a Tagliabue pyrometer, inserted in the flue immediately above the boiler, ranged only from 330° to 350° Fahrenheit, averaging 335°. With ordinary fuel, 600° to 700° is not an unusual temperature for such chimney gases.*

THE TEMPERATURES OF THE PETROLEUM FURNACE AND STACK.

The temperature of the fire-space or hearth, of the oil furnace, was determined by the familiar method of Pouillet, by heating therein a weighed block of iron and then plunging the same into a weighed quantity of water of known temperature. The weights of iron and water, the initial and final temperatures of the water, and the known (very different) capacities for heat (or specific heats) of water and iron, as 1000-1124 furnish the data for very simple calculation of the temperature of the flame. The first experiment, with all proceeding in fair order (though the furnace was not considered to be doing its best), the iron weighing 5-2657 lbs. and the water 20 lbs., the initial and final temperatures being 75°-5 and 174° F., calculates to 3221°-5 F. Before the second one was obtained, the furnace—an old one and out of repair from the outset of all these experiments—was giving out; a considerable part of the crown having fallen in. The second weights were 7-51 lbs. iron and 25 lbs. water, and the temperatures 75°-25 and 184°. This calculates to 3232° F. The errors (loss of heat, etc.), were all against the furnace, and all the experts present agreed in the conclusion that a heat of 3500° F. could undoubtedly be obtained with this flame in a properly constructed furnace in good working order. To give an idea of this temperature, it may be stated that the greatest heat obtainable in the iron blast furnaces, according to Becquerel, is 3300° F. Cast iron (same authority) melts at 2786° F.; steel, somewhere above 3000°; but authorities differ largely on this latter point, which must be considered as still unsettled.

The temperature of the chimney gases, after passing the boiler, was on this day lower than usual, ranging from 330° to 350° F., indicating, doubtless, a lower initial temperature of the fire space than previously, due to the increasingly bad condition of the furnace. The temperature of the air having been 80°, the proportion of the total heat produced, that was being utilized and saved in this furnace, is easily calculated. Taking 3300° as the maximum heat, and 335° as that of the chimney, this proportion is equal, by an obvious formula, to:

$$\frac{3300 - 80}{3300 - 335} = 92.39$$

or 92-39 per cent. of the total heat, as the saving in this operation. This is a very large proportion. If we now, in round numbers, allow 10,000 centigrade units as the total calorific capacity of the oil, from Deville's actual determination, =18,000 Fahrenheit units; we can easily calculate how much steam should be made by this furnace, when carrying also its full load of iron; that is, if we make one arbitrary allowance of 5 per cent. loss for one small unknown factor, namely, the sum of the latent heat of fusion and specific heat of the slag. In this case we have no allowances to make, as with coal, for imperfect combustion and specific heat of ashes and cinders. 200 lbs. of oil per hour = a total heat of 3,600,000 F. units; 92-39, minus 5 per cent. for the slag, or 87-39 per cent. of this = 3,146,040 units. The specific heat of iron being taken at 11, to heat the 3000 lbs. of iron to 3000°, takes 336,000 units, and there is left for steam 2,810,040 units per hour. Taking the heat of steam from water at 80° F.; as 1148 units, there must be 2447 lbs. of water converted into steam per hour; or assuming 1 lb. best anthracite burned directly under the boiler equal to making 8 lbs. of steam, we have here in the waste heat of one petroleum furnace, heating also 3000 lbs. iron, the equivalent of 306 lbs. of coal burned per hour, or 408 lbs. every 80 minutes, directly under the boiler. It is no wonder, then, that with one furnace, the result, so surprising at first sight, is obtained of steam got up every 80 minutes for running six large boiler plates through the heavy rolls. It is fair to remark that to do this required two coal furnaces, the rolls and fly-wheels being much out of level, and running very hard. These figures are very satisfying, as they fit well with the actually observed work of the oil, and amount to a chemical and mathematical demonstration of the immense value of this invention.

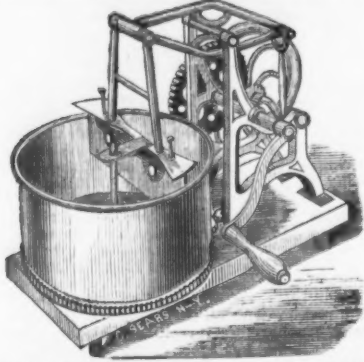
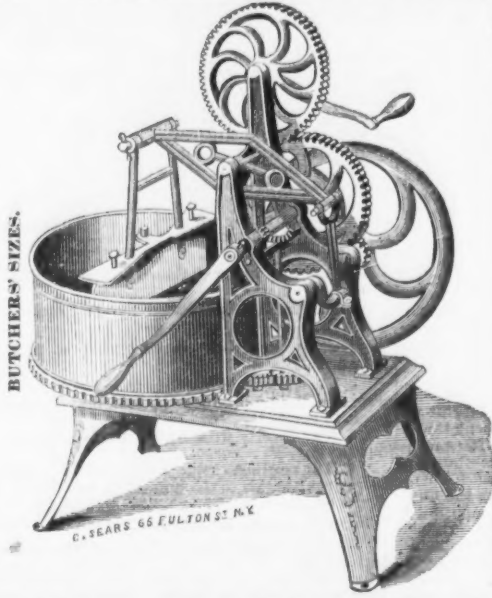
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*The pyrometer here used was borrowed from Prof. Thurston, being one used and relied on by him.

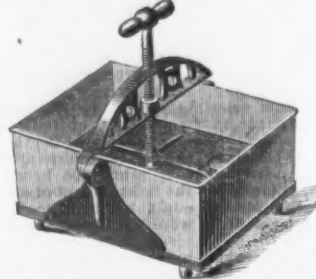
*This is a figure for the specific heat of iron used by Prof. Thurston. It is a trifle lower than some other authorities, but he believes it more reliable. There was no hanging of feed water on this day, nor at any time during these experiments; the apparatus for the purpose being dismantled. All the water was pumped into the boiler cold, on all occasions.

* See the Proceedings of the American Association for the Advancement of Science for 1858, page 176; also Siliman's Journal (*Am. Jour. of Science*), vol. xxvii., page 24.

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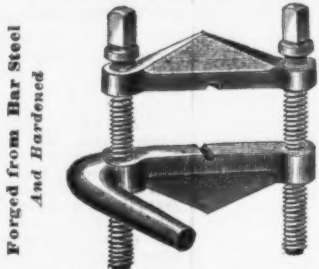
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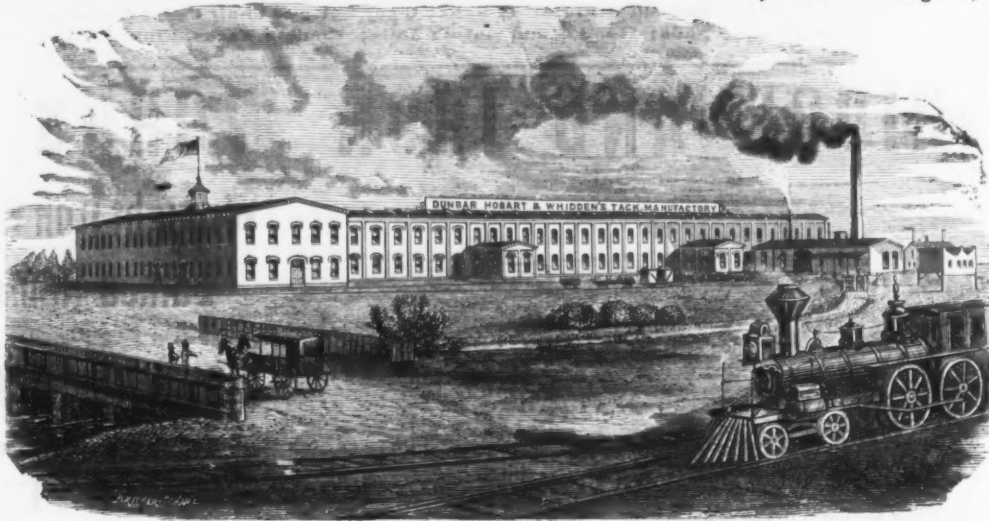
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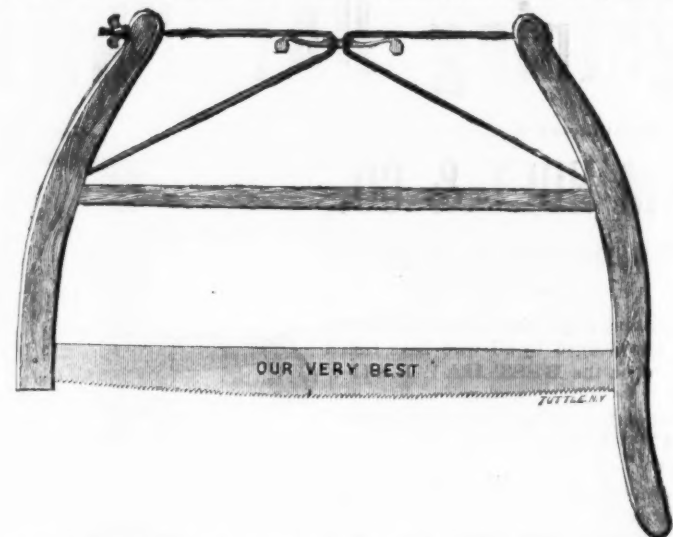
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The Southern States Coal and Iron Company.

From a prospectus issued by the Southern States Coal and Iron Company of Stockton-upon-Tees, England, we learn of another scheme for the investment of English capital in American mining lands. The purchases already made on behalf of this company consist of some 50,000 acres of coal lands on the Cumberland mountains; also about 100,000 acres of iron lands, in different sections of Tennessee, comprising a full assortment of all the different families of ores, thereby insuring the very best quality of iron. All of their properties are contiguous to each other, both by rail and river, and especially to their property site, where they intend erecting their factories, which from the map which accompanies the prospectus, appears to be on the Tennessee River, a few miles above Bridgeport. Their prospectus gives a full analysis of all their ores; also their coal and coke. By actual comparison their coal and coke is equal to the best Pennsylvania coke and coal, while their ores, taking into consideration the fact of the great assortment that exists, far exceeds any locality in the United States. The quality of their coal lands, of which we can particularly speak, we think cannot be excelled anywhere. They consist of a little over 50,000 acres, and have an aggregate thickness of over thirty feet of coal. The lands are very fair for farming, while for raising fruits of all kinds they are not excelled anywhere. The lands are mostly covered with chestnut oak, from which is taken the bark which is used in making the tannin extract, which has of late years become an article of considerable export. From this one article alone may be derived an income worth much more than they pay for the land. The men who compose the company are among the wealthiest of England, including such men as Daniel Adamson, James Bowron, F. A. Babcock, Henry Barrett, William Barrett and the Whitwells.

Patent Saws.

The Wheeler, Madden & Clemson Mfg. Co. have added to their assortment for the season of 1875 a new pattern Framed Wood Saw which they style "Our Very Best," and which is illustrated in the accompanying cut. This



Frame was patented February 9th, 1875, and is strained by an adjustable thumb lever connecting the braces. The saw is belled, an improvement which makes it take hold readily, and

which is a chamber the full size of the stack at its largest diameter, covered with close top or left open, at the pleasure of the operator. This space is calculated as a combustion chamber for the gases arising from the charges, in which the hot blast pipes can be placed, forming essentially the hot blast oven.

The doctor proposes that he can introduce at any one of his bridges any amount of oxygen which may be desired; that he can also thoroughly carbonize his charge, as it is passing down, in such manner as to make any grade of metal which may be required for iron or steel purposes, and thus dispense with all subsequent manipulation to obtain graded metals. He also attaches a reheating furnace to the bottom of the smelting furnace in such a manner as to take the molten or reduced metal directly from the smelting furnace, by its gravity as it comes down, and manipulate it into balls ready for the rolls.

The scheme is quite an elaborate one, but whether it is fully practical can only be told by trial. We fancy that the large amount of wall surface would be an objection on account of the liability to cut and the great trouble in making repairs; and the labor of watching the charge from the bottom up, upon six bridges, and by means of a tool assisting to bring it down, is an untried experiment. Too much or too little fuel would defeat the operation of the whole scheme, and to grade the quantity exactly right, where the mass is not compacted and is subject to easy disturbance, would be a difficult matter. Still, the scheme is worthy of investigation, and we give it to the criticism of our readers.—*Cleveland Trade Review.*

A Railroad 300 Feet Above a City.

It is difficult to imagine anything better adapted to produce a vivid and startling impression on the memory than the first sight of Morlaix, Brittany, as approached by rail. The city lies on both sides of a deep, narrow valley, and the railroad springs across the chasm on a magnificent viaduct 300 feet high. Entirely unprepared for anything of the sort, the traveler suddenly finds himself taking a bird's-eye view of a city of the middle ages. There it lies, 300 feet below, almost as if it were in the days when Mary, Queen of Scots, passed through here on her way to Holyrood and the scaffold. The precipitous, winding, narrow, darksome streets, the peaked roofs, misshapen by time and stud-



supplies additional substance to that portion of the blade most subjected to wear.

We also illustrate their patent Interchangeable Compass Saws and X. L. C. R. Corn Knife, which are placed on the market this season for



the first time, and, we are informed, are favorably received by the trade.

New Process for Making Iron.

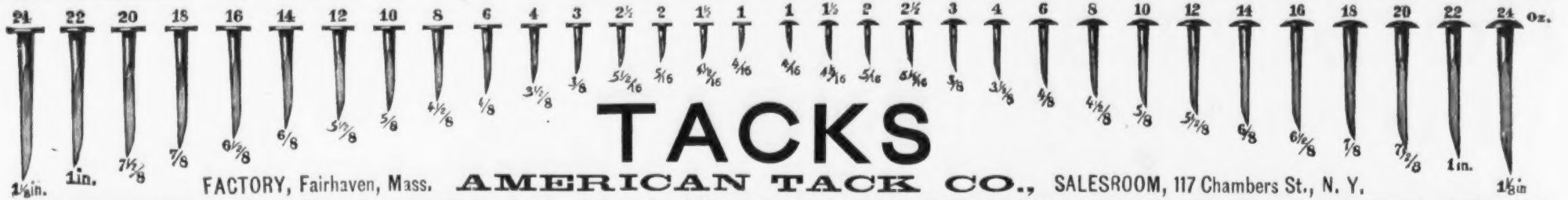
Dr. Clark, formerly of Cleveland, late of Atlanta, Ga., has shown us a plan which he has devised for the reduction of ores, which presents some novel features, and which he claims will reduce ores effectually and economically. He builds up a stack consisting of a series of arches, one above another, each formed narrow at the bottom, or exit, and large at the top, with a bridge built transversely across its largest area. The top of this bridge forms a table which receives the charges of ore and fuel, which, as it is affected by a reverberatory flame which passes up the stack in the front and rear of the bridge, runs over the sides and falls from one to another of these bridges until the hearth is reached. Both at the front and rear of the stack openings are left in it on a line with the top of the bridges, one for tuyere irons and the other for the introduction of a puddle bar, whereby the downward movement of the charge is not only facilitated, but the iron or other metal is more thoroughly pressed from the scores.

The charge is introduced through a chute in the front of the stack near the top, above

Morlaix with laughter and song. Should it be a festival day or a fair, the sight is still more unique, for the square is then crowded with booths and peasants in various costumes, and is positively white with the starched caps of the

women. The city is divided by the river of Morlaix, an estuary upon which ships come into the heart of the town. The banks of the river are faced with granite, and afford a fine promenade on each side. A smaller stream dashes roaring down the streets, bringing to the dirty lanes of the crowded town the music of the pure fountains whence it came. At Morlaix one finds himself literally in the land of wooden shoes. Almost without exception they are worn by all—of various forms and sizes, colored or uncolored, to suit the whims or purse of the wearer, but always the sabot.

The steamer City of Richmond, on the last trip to New York from Liverpool, made what is claimed to be the quickest time on record between the quarantine stations on either side of the Atlantic. The vessel left Queenstown at 4:30 p. m. on Friday, July 16, and reported off Sandy Hook at 11:30 a. m. Saturday, July 24, making the total distance in 7 days, 19 hours. At 1 p. m. Saturday the officers reported at quarantine. The daily distance made was as follows: First day (19½ hours), 390 miles; the following days, 363, 360, 380, 366, 363, 361, 361, making an average daily run of 365 miles. The Adriatic is said to have made the trip in less time to a point off Sandy Hook, but owing to a dense fog near the Hook the steamer did not report for some time afterward.



FACTORY, Fairhaven, Mass.

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Upholstery, Gimp, Brush, Card, Pall and Chair Box Tacks; Leathered, Tinned and Iron Carpet Tacks; Bright and Blued Finishing Nails; Cigar Box and Chair Nails; Trunk and Clout Nails; Brads, Patent Brads, Copper Tacks and Nails; Iron, Zinc, Steel and Copper Shoe Nails; Polished 2d and 3d Fine Nails; Roofing and Slatting Nails; Roofing Tacks, Tinned Tacks and Nails of every variety. Any size or style of Tack or Nail made to sample. **Orders sent to either Factory or Salesroom will receive prompt attention.**

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Curry Comb.

The Best yet Invented.
CHEAP AND DURABLE.
 Is Pleasant to the Horse, and does not injure
 the Brush.

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Lester Oil Co..

183 WATER ST., N. Y.

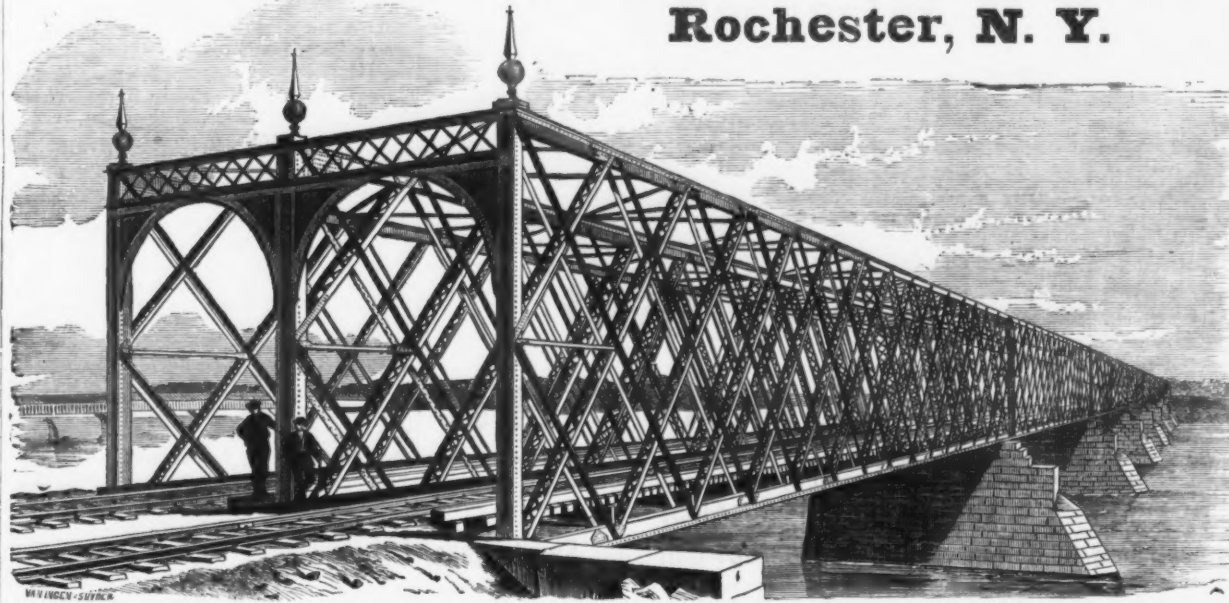
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Synovial Lubricating OILS.

The most Durable, Reliable & Economical Lubricant in existence ;
Applicable to every grade of machinery. Send for Circular and Price List.

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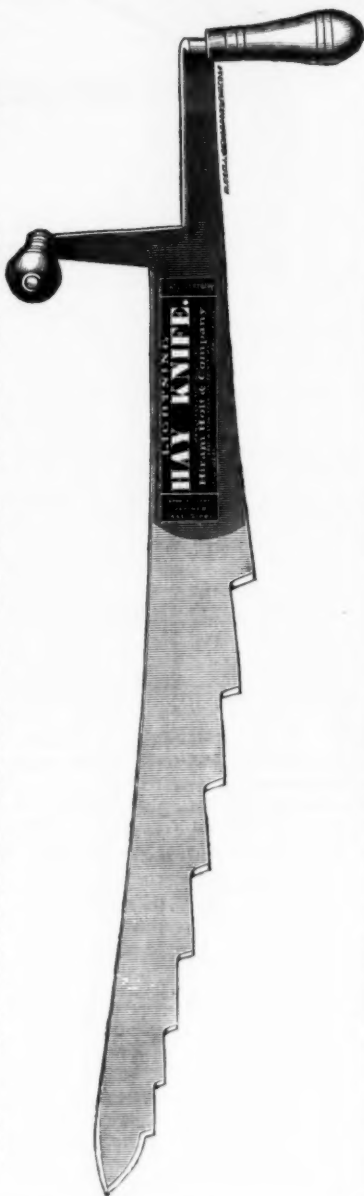


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Lightning HAY KNIFE,

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East Wilton, Franklin Co., Me.



These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

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BEMIS & CALL HARDWARE & TOOL CO. Springfield Mass.

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Genuine D. R. BARTON EDGE TOOLS.

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MADE,

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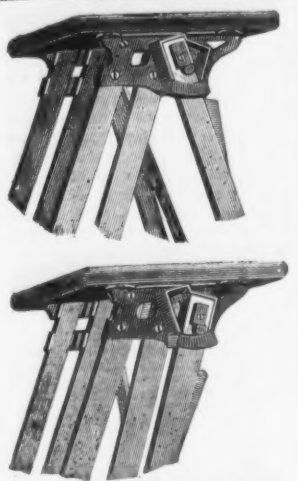
CONCORD AXLES

Will Run Easier, carry a Larger Load, and Wear Longer than any other Axle in the Market.

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Automatic Lock Hinge
STEP LADDER.
The Best and Cheapest in the World.

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Manufacturers of
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We make a Specialty of
WALNUT and ASH WAINSCOTING,
STEP LADDERS,
EXTENSION LADDERS,
Clothes Horses, Rat Traps,
TOWEL ROLLERS, &c.,
AND HAVE THE
Best facilities for the manufacture of Straight and Irregular Turned Work.

The following is a partial list of the Jobbing Houses that keep our goods in stock.
Fratt & Co., Buffalo, N. Y.
C. H. Walbridge & Co., " "
John H. Hill, Rochester, " "
L. L. Thurwacht, Syracuse, " "
S. & P. Templeton, Albany, " "
M. A. Burrows & Co., Troy, " "
Hopping Bros. & Osburn, New York.
J. H. Knapp & Co., " "
Ames Plow Co., Boston, Mass.
W. H. Banks & Co., Chicago, Ill.
David Landrath & Son, Phila. Pa.
Griffith & Page, " "
Thos. Norris & Son, Baltimore, Md.
J. Seth Hopkins & Co., " "
Lindsay, Sterrett & Co., Pittsb'g. Pa.
Buhl, Ducharme & Co., Detroit, Mich.
Tos. Holliday & Co., Cincinnati, O.
W. P. Kurtz & Co., " "
McIntosh, Good & Co., Cleveland, O.
Bingham & Williamson, " "
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AGENT FOR

American File Co.'s Files.
J. M. King & Co.'s Stocks and Dies.
Blake Bros.' Butts, Pullies, &c.
Greenfield Tool Co.'s Planes.
H. S. Brooks' Screw Eyes, Hooks, &c.
Watson & Co.'s Cotton, Wool & Horse Cards.
Thrall's Try Squares, Bevels and Rules.
J. P. Verree's Hammers and Edge Tools.
Judd & Blakeslee's Snaps, Snap Fasteners, &c.
H. Wilkinson's Miners and Screw Drivers.
Bliss & Co.'s Hand and Bench Screws.
T. T. Rhodes' Saw Handles.
American Screw Co.'s Rivets and Screws.
Stillman's Saw Sets.
Dodge's Kentucky Cow Bells.
Holroyd & Co.'s Stocks and Dies.
C. S. Griswold, Augers and Bits.
Romer & Co.'s Pad Locks.
Wm. Cleveland, Star Pancakes.
Bullock's Babbitt Metal.
Cowles' Hardware Co. Miners, &c.
Robbins' Cotton Lines.
Amidons' Braces.

The Celebrated DUBUQUE.
Acknowledged by all to be the Standard Soft Coal Burner of the West.



1. It is all cast iron—simple in its construction, and no machinery to get out of order.
2. It is a perfect gas and smoke burner.
3. It is the most powerful heater.
4. The fire is under perfect control at all times.
5. It combines the reversible flues and exposed fire chamber, and clinkerless grate.
6. It ventilates the room perfectly.
7. No dust or ashes escape into the room while managing it.
8. Has shaking and dumping grate with ash drawer.
9. The fire-pot being exposed to the cold air and made in two parts will outlast any in use.
10. The fire will keep from 20 to 30 hours without replenishing.
11. The parts directly exposed to the fuel can be replaced with but little trouble and expense.
12. Its operation is perfect with the poorest coal found in the West.
13. All parts of the base are heated perfectly.
14. Its beauty of design gains for it admission into any parlor.
15. It is especially adapted for the use of a Tea-kettle, from which boiling water can be had in a few moments.

The Manufacturers have made it a specialty for the past seven years. It is guaranteed in every respect to be a perfect Soft Coal Burner and without a rival. Send for Samples and Catalogues to

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Pomeroy, Peckover & Co.,

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From 2 in. to 50 in. diameter.
Also, Fire Hydrants, Single and Double Nozzle.

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MASS.

Steam Railway Approaches to the Centennial Buildings.

The Pennsylvania Railroad Company has perfected its plans for a large, substantial, and commodious depot, which will be erected within the shadow of Machinery Hall, a short distance west of the point where Belmont avenue and Elm avenue intersect each other. This depot will be 650 feet in length and 100 feet wide. The tracks in it will be laid down in the form of a circle about 1000 feet in diameter. Around this circle, within the depot, three tracks will be laid, and they will be used for all trains arriving and departing from New York, Baltimore, Washington, and innumerable other places with which the Pennsylvania Railroad has direct communication.

The trains from Jersey City and other points east and north will run direct to the Centennial grounds, reaching them by the north track in the depot, and then switch around into the yard. If three of these trains should arrive at the same time they will run from the main track and be switched once upon each of three tracks which compose the circle mentioned, and the trains will be made to stop on the Belmont avenue side, in such a manner that they will not overlap each other.

A hotel capable of accommodating about 5000 guests will be erected near this depot, and visitors from abroad will be enabled to take their seats in cars at the depots of different cities and be rapidly transported almost to its doors.

Trains which do not leave immediately after their arrival will run around the circle mentioned, and be backed upon some of the numerous sidings which it is the purpose of the Pennsylvania Railroad Company to construct on the north of the main tracks. The locomotive will be headed east, and will not leave its train, but when the time arrives for the departure of the train it will again be put upon the circle. It is intended that departing trains will invariably reach the main track from the circle, headed in the direction they are to proceed, and by this plan all danger from backing trains will be obviated.

A large number of sidings will be constructed west of Fifth street, for the purpose of carrying out empty boxes, waste material, etc., from the exhibition buildings, and it is proposed by the Centennial Commissioners to erect buildings in that vicinity for the purpose of storing the articles mentioned. The tracks that run through the Centennial grounds and buildings now will remain during the Centennial, and within the enclosure there will be over seven miles of railroad track.

Other improvements are contemplated by the Pennsylvania Railroad Company, and when the Exposition opens, its arrangements will be as perfect as they can be made.

The Reading Railroad Company has completed arrangements for the erection of a handsome frame depot a short distance from the Art Gallery. The principal object of the company is to accommodate passengers during the Centennial, but the building will be a permanent one, and after the Centennial it will serve as a general rendezvous for excursionists to Fairmount Park. This depot will be about 800 feet from the Art Gallery, and will be in a sort of triangle, formed by the Junction Railroad, Landsdowne Drive and River Road.

All the trains that run over the Reading Railroad from Pottsville and other cities and towns along the line of the road will carry all passengers to this depot who desire to visit the Centennial. The depot will be very ornamental. It will be of the French-Swiss style of architecture, and will present a rural, attractive and substantial appearance.

There will be within the depot a grand hall and large waiting room 125x45 feet in extent. A large ticket office will be erected in the center, and there will be two large wings 80x40 feet, at either end of the building. The eastern wing will be used principally for refreshment purposes, and a large restaurant will be located there, which can be approached by two entrances from the main hall. There will be a kitchen 25x30 feet. The other, or western wing, will be divided principally into ladies' and children's sitting rooms.

The entire length of this depot will be 280 feet, and the height 110 feet. A belfry and ventilator will rise from the center of the roof, and a large and conveniently constructed platform will be built, extending along the track for a distance of 500 feet and a width of 69 feet, and on this platform all passengers will be landed. A grand staircase will ascend to the main hall, and it will be 48 feet in width, rising from the platform to the height of 20 feet. Passengers will emerge from the main hall into the restaurant on the east, and a covered bridge, 48 feet wide and 30 feet long, will lead into the park, and the entire staircase will be covered.

Reading and retiring rooms will also be constructed, and the entire building will be erected in accordance with plans furnished, under the supervision of Mr. William Lorenz, chief engineer of the Reading Railroad Company.

It is also the intention of the Reading Railroad Company to construct a siding about 800 feet in length at a point about 200 feet from the Thirty-fifth street entrance to the Zoological Garden, with a small depot and platform at the end for the accommodation of visitors to the gardens.

Another railroad feature of the Centennial will be a number of peculiarly constructed and commodious cars, now being made by the Cumberland Valley Railroad Company, to run to the Centennial grounds over their own and the Pennsylvania Railroad. These passenger cars will have the seats numbered, and directly over each seat will be a receptacle provided with a lock and key, which will be used only by the passenger occupying the seat. The passenger when he purchases a ticket receives a key, to which a check is attached, and on this check

number is stamped which corresponds with the number of the seat he occupies. The passenger will use the key to unlock the closet over his seat, but it will not unlock any other closet.

When the excursionist reaches Philadelphia or the Centennial grounds, he can lock up any portion of his baggage, and thus have it kept in safety in the cars. They will be run upon a siding near the Centennial buildings, and the excursionist can depart from the train and return to it at will to unlock his closet and put in or take out food or clothing, or any other article. When the train returns the check and key are taken up by the conductor with the ticket. In these cars a Centennial excursionist who does not wish to put up at a hotel, can have what might be termed his private apartments in the car that brings him to the Centennial buildings.—*Railway World.*

Iron Matters at St. Louis and Vicinity.

A correspondent of the *Chicago Journal of Commerce* sends the following iron trade gossip from St. Louis:

In St. Louis two furnaces are in successful operation and six are idle; the furnaces in blast are making 20 per cent. on every ton of pig iron made. In the State of Missouri there are ten charcoal furnaces; three in blast and seven out, so that out of eighteen furnaces in Missouri only five are in successful operation and thirteen laid up; and yet with this status of the furnaces it is predicted that there will be a larger product of pig iron in 1875 than in 1874. I think the end of 1875 will show pig iron on hand to the amount of 1,500,000 tons.

The continued march of all industries is "onward." They make such strides that products are now almost limitless. Consumption does not now keep pace—that is limited—especially in the present times, to actual necessities; therefore it becomes the desiderata of producers to reduce the cost of manufacture to its minimum in order to produce iron at its lowest possible rates. The charcoal furnaces, if possible, should be located where the timber, the ore, the limestone and water are abundant, and, therefore, the West and South must eventually be the producers. There are many such locations in this State where iron can be produced at the furnaces with a small outlay of capital at \$16 a ton; then, with low freights to the East, the supremacy of the West to make and supply her markets will be established. Only three years ago, Messrs. A. L. Crawford, Thos. Scott and W. A. Scott, of Pennsylvania, built a railroad from Cuba, on the A. and P., to Salem, in Deut county, for the purposes of developing the iron ores of this part of Missouri and of the Simmons Iron Mountain, which they had purchased, and during last month this road shipped over 40 car loads each day, or 400 tons. The last year's experience has proved that the ores on the line of this railroad are exactly what are needed for making the iron technically known as Bessemer pig; nearly the whole product is used for conversion into steel. The Simmons Mountain is the largest deposit on this line of railroad, and shows in some places some 80 feet of solid ore. It is the red hematite mixed with blue specular, and though in some places there are faults, the prospect is very flattering for a large body of ore. The Orchard Bank lies about a mile north-east of the Simmons, and is owned by Messrs. Lewis, Card & Co. It is a very fine deposit of the same kind of ores, known as the Meramec. This company has not only worked up to a face of over 50 feet, but also have sunk a shaft over 30 feet deep below the surface, demonstrating over 80 feet of solid ore! They are shipping over 150 tons daily. East of this bank, and adjoining it, is the Millsap Bank, now leased by the Midland Furnace Co., of Steelville. The ore of course is the same as all the mines in this part of Missouri. It shows a very fine deposit, and will, no doubt, prove to be a valuable mine, both to the lessors and the Furnace Co. There are several other mines within a few miles of these which are not yet developed. Within a short distance of this there are several very fine furnace sites. A few miles northeast of Salem is the celebrated Benton Creek Bank, belonging to the James' estate, but leased by the Meramec I. & M. Co.; it is about a mile off the railroad, and the company have built a switch to the mines. They have been shipping over 150 tons a day, but when I was there the men were off and nothing doing—the day before having been pay day—so I left to continue my trip at some future time.

We have had so much rain that the old Mississippi looks something like a river at the present time. The water is nearly twenty-eight feet above low water mark, and the foot of the arches of our great bridge only about ten feet above the water surface, and East St. Louis is threatened with submergence, should the river rise another two feet. The large steamboats can no more go under the bridge, so that this city is at present the break of gauge, as it were, on railroads, and the transfer of all freight for up river.

The Vulcan Iron Co. have begun the foundations of their steel works, and will soon begin the buildings. Business of all kinds is in the same despondent state it has been for months, but the crop reports promise a large yield of cotton and all cereals, so that the prospect for a large fall trade is very encouraging, with which promise I close for the present.

The Manada Furnace, at Swarta, Dauphin county, Pa., has been blown out, and a well-informed correspondent tells us it will be finally abandoned. This furnace, now owned by Grubbs & Bland, was built in 1836. It is a single cold-blast charcoal stack, 31x8, using water-power. Another relic of our early iron industries will be wiped out when this stack is pulled down.

Box 3091, N. Y.

Trade Report.

Office of THE IRON AGE
WEDNESDAY EVENING, August 11, 1875.

The past week has been one of uninterrupted quiet in Wall street, notwithstanding an attempt on Friday to create an excitement by the circulation of "canards" respecting the credit of certain prominent banking firms, but which accomplished nothing more serious than causing a temporary decline of 1 @ 3 per cent. in speculative shares. In other respects the week has been comparatively uneventful. The only failure of prominence was that of Archibald, Baxter & Co., grain dealers.

The money market continues easy, with 1½ @ 2½ per cent. as the rates to borrowers on call, and 4 @ 5 per cent. discount on prime commercial paper.

The gold market has been strong, with a range of 113½ @ 114. The Treasury sales for the week have amounted to \$1,500,000 at 113½ @ 113-2. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday.....	113½	113
Friday.....	114	113½
Saturday.....	113½	113
Monday.....	113½	113
Tuesday.....	114	113½
Wednesday.....	114½	113½

The bond market has continued quiet, and prices have moved in sympathy with gold. There continues a moderately active demand for desirable railway mortgages. We give below the closing quotations of governments.

The stock market was somewhat irregular early in the week, but settled down into steady dullness. The principal dealings have been in Western Union, Lake Shore, Pacific Mail, Ohio & Mississippi and Northwestern. We give below the highest and lowest quotations of shares on the active list.

The bank statement shows a decrease in total reserve of \$1,335,500, and in surplus reserve of \$1,434,675, the banks now holding \$27,070,000 more lawful money than the law requires. The following is a comparison of the bank averages for the past two weeks:

	July 21.	Aug. 7.	Differences.
Loans.....	\$779,907,700	\$780,434,300	Inc. \$526,600
Specie.....	15,737,300	16,334,400	Inc. 597,100
Leg. tend.....	75,534,000	73,601,300	Dec. 1,932,700
Deposits.....	231,066,000	231,800,000	Inc. 734,000
Circulation.....	15,574,100	15,521,800	Dec. 52,300

The following tables show the foreign trade movements for the week:

	Imports.	1874.	1875.
Total for week.....	\$6,985,841	\$7,009,676	\$4,786,292
Prev. reported.....	\$4,558,090	\$4,853,750	\$5,904,531
Since Jan. 1.....	\$202,543,901	\$233,393,496	\$210,690,823

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anyils.....	12	\$135
Brass goods.....	6	962
Bronzes.....	25	5,533
Chains and anchors.....	94	6,197
Copper.....	2,283	2,283
Cutlery.....	73	22,492
Guns.....	39	15,509
Hardware.....	33	2,846
Iron, pig, tons.....	500	17,207
Iron, sheet, tons.....	37	17,124
Iron, R. R. bars.....	994	15,406
Iron tubes.....	8	160
Iron ore, tons.....	372	572
Lead, pigs.....	2,517	26,516
Metal goods.....	305	23,309
Nails.....	61	1,878
Needles.....	17	9,757
Old metal.....	1	9,757
Platina.....	1	4,350
Plated ware.....	1	400
Per. caps.....	18	2,497
Steel.....	19	23,196
Silverware.....	219	2,190
Tin, boxes.....	10,400	72,364
Tin, slabs, 2,008.....	198,700	35,619
Wire.....	11	2,779
Zinc.....	11,667	768

EXPORTS OF SPECIE.	
Total for the week.....	\$1,123,918
Previously reported.....	59,912,986
Total since January 1, 1875.....	\$61,036,904
Same time in 1874.....	36,876,500
Same time in 1873.....	34,016,788
Same time in 1872.....	54,861,039

Government bonds at the close were firm at the following quotations:

	Bid.	Asked.
U. S. Currency 6's.....	122½	123
U. S. 6s 1881, reg.....	120½	121
U. S. 6s 1881, cou.....	121½	122
U. S. 5-30 1884, reg.....	116½	117
U. S. 5-30 1884, cou.....	115½	116
U. S. 5-30 1885, reg.....	119½	120
U. S. 5-30 1885, cou.....	119½	120
U. S. 5-30 1886, reg. new.....	119½	120
U. S. 5-30 1886, cou.....	119½	120
U. S. 5-30 1887, reg.....	120½	121
U. S. 5-30 1887, cou.....	120½	121
U. S. 5-30 1888, reg.....	121	122
U. S. 5-30 1888, cou.....	121	122
U. S. 10-40 reg.....	118	119
U. S. 10-40 cou.....	118	119
U. S. 5s 1881, reg.....	116	117
U. S. 5s 1881, cou.....	116½	117

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated.....	104	104
Lake Shore.....	60½	59
Roe Island.....	105½	105
Del. Lack. and Western.....	130	130
Michigan Central.....	62½	62
Cleveland and Pittsburgh.....	89½	89
Western Union Telegraph.....	81½	81
Atlantic and Pacific Telegraph.....	19½	19½
Northwestern.....	41½	41½
Mississippi & St. Paul.....	36½	36½
Ill. & Ind. Pac. R.R. Pref.....	59½	59½
Pacific Mail.....	38½	38½
Erie.....	14½	14½
Ohio & Mississippi.....	19½	19½
Union Pacific.....	71½	71½
Kansas Pacific.....	11	11
Missouri Pacific.....	45	44
Atlantic and Pac. R.R. Pref.....	13½	13½
United States Express.....	42	41½

GENERAL HARDWARE.

The changes in lists and discounts during the week have been few and unimportant. A good many buyers from the West and Southwest are in town, and some of our city houses bear unmistakable evidence of improving business. The discouraging accounts from some sections, regarding the recent floods, has had a very depressing influence, but it is believed here that, although great damage has been done, the misfortune has been greatly exaggerated, and already a reaction is felt, and a better demand for

goods from those sections is being realized. From the Northwest the reports are of the most cheerful nature, and buyers from that section expect a heavy business this fall. A correspondent, writing from the Southwest, says: "Trade in general lines, through the central Mississippi Valley, light; business dull, owing to recent heavy rains; good trade from South and Southwest."

Foreign Hardware participates in the general improvement, and prices remain unchanged. Hermann Boker & Co. have taken the exclusive agency for H. Wilkinson's Warranted C. S. Screw Drivers (American). They have a full assortment of these goods in stock.

Henry Diston & Sons invite the attention of the trade to their large assortment of Framed Wood Saws, Saw Handles, etc. These goods are manufactured from thoroughly seasoned lumber, and are offered to the trade at prices to suit the times. In their advertisement on page 29 they illustrate some of their styles of Wood Saw Frames, and their well known patterns of Cross Cut Saws.

The demand for Nails continues inactive, and prices remain at about the quotations of last week. Some brands of Nails are firmly held at \$23-25 for 10d., while other good brands can be readily obtained at \$23-20. We quote 10d., in large or small lots, \$23-20 @ \$23-25, net.

Fernald & Sise have taken the agency, in this city, for Wright's Patent Tin Sieves, which they offer to the trade at the following list, less discount 20 and 5 per cent.:

	Price List.
No. 1, 13 inch, weigh 14 lbs. per dozen.	
No. 14 Mesh.....	Ann. \$4-00 Plated \$4-75
No. 16 ".....	Ann. 4-00 Plated 4-75
No. 18 ".....	Ann. 4-25 Plated 4-75
No. 20 ".....	Ann. 4-50 Plated 5-25
No. 24 ".....	Ann. 4-75 Plated 5-75

	Price List.
No. 1, 11 inch, weigh 11 lbs. per dozen.	
No. 14 Mesh.....	Ann. \$3-75 Plated \$4-75
No. 16 ".....	Ann. 3-75 Plated 4-75
No. 18 ".....	Ann. 3-75 Plated 4-75
No. 20 ".....	Ann. 4-00 Plated 4-75
No. 24 ".....	Ann. 4-00 Plated 4-75

These Sieves are strongly packed, one dozen in a box, and are shipped as Hardware. Having increased our facilities for manufacturing, we will now fill all orders on short notice.

John C. Jewett & Sons, Buffalo, N. Y., have issued the following Appendix "A" to their illustrated Catalogue, under date of 2d instant. As it contains a number of new and seasonable goods we reproduce it entire. All of the goods in this Appendix, except those marked "net," are subject to discount 25 per cent. In their advertisement on page 25 they illustrate their "Utility" Covered Coal Hods and new style of Coal Vase, which are worthy of attention.

Bruce's Patent (New York) Vase for Hard Coal—Patented June 30, 1874.

This Improved Vase will be found superior to anything hitherto before the public as a Parlor Vase to feed a grate fire or stove with Anthracite Coal, as you have only to shovel coal from the front opening, avoiding the inconvenience of lifting a heavy load or of tipping over the old style Vase to shovel coal therefrom.

No. 40 A, Assorted Finish, each.....\$7-00
No. 45 A, Assorted Finish, with Jewett's Patent Fire Set Attachment, each.....\$8-00

Bruce's Patent Coal Vase with two Compartments for Bituminous Coal—Patented June 30, 1874.

The front receptacle is for Lump Coal, the rear one for fine Coal, the latter falling into the basement, where it is readily reached with a shovel through the opening in front of same. The two descriptions of Coal not interfering with each other.

No. 30 A, Assorted Finish, each.....\$7-50
No. 35 A, Assorted Finish, with Jewett's Patent Fire Set Attachment, each.....\$8-50

Jewett's Patent Fire-Set Coal Vase for Bituminous (Soft) Coal, Improved for 1875—Patented Dec. 10, 1874.

The Patent Attachment for holding shovel, tongs, &c., are of entirely New Design, very handsome and much better adapted to the purpose. Furnished with inside Reservoir.

No. 10 A, Black and Brown, assorted, Gold Shield, each.....\$6-50
No. 11 A, Black and Brown, assorted, Gold and Pictures, each.....\$6-50

No. 12 A, Black, Gold and Colors, each.....\$6-50
No. 30 B, Black and Brown, assorted, Gold and Pictures, each.....\$6-00
No. 31 B, Black, Gold and Colors, each.....\$6-00

Jewett's Coal Vase.

Elegantly Ornamented with Fruit Pieces, Flowers, Landscapes, &c.

No. A Vase has inside Reservoir. Assorted styles of Ornamenting, each.....\$5-25
No. B Vase, Cushion Top. Has inside Reservoir. Assorted styles, each.....\$4-75

No. C Vase, Stamped Cover. Has inside Reservoir. Assorted styles of Ornamenting, each.....\$4-25
No. F Vase, Cushion Top. Has inside Reservoir. Assorted Decorations, each.....\$4-00

THE "HEAT" TEST.

The Utility Covered Hod—Patented March 31, 1875.

With Patent Galvanized Iron Bottoms. Superior to all others for the following uses: The best Trench Hod for feeding Base Burning Stoves. More convenient than Helmet, or Arch-top Hods, for either soft or hard coal where coal tongs are used in feeding the fire.

Price List of Utility Coal Hods.

	Plain, with Bronze Bands.
No. 16, 16 inches, per dozen.....	\$14-00
No. 18, 18 ".....	16-00
Fancy, Decorated.....	
No. 116, 16 inches, per dozen.....	\$17-00
No. 118, 18 ".....	19-00

The Helmet Parlor Coal Hod.

Cushion Top. Beautifully Ornamented with Landscapes, etc. One size, 17 inch, per dozen.....\$21-00
The X L Coal Hod. A New Article—Patented.

Body Japanned; Bottom of Galvanized Iron, producing galvanic action, preventing rust; equal in durability to a hod made wholly of Galvanized Iron.

Plain Black Japanned Coal Hod. Double Seamed and Riveted. Round Bottom.

Galvanized Iron Bottom.

No. 9, 15 inch.....per dozen, \$6-75
No. 10, 16 "....." 7-50
No. 11, 17 "....." 7-75
No. 12, 18 "....." 8-25
No. 13, 19 "....." 9-25
No. 14, 20 "....." 10-25

These Hods are full measure, width, length and height.

John C. Jewett & Sons' New Styles Brass Cages—Patented October 27th, 1874.

No. 00.....Per doz. \$16-50 No. 430.....Per doz. 69-00
No. 200....." 20-00 No. 435....." 66-00
No. 205....." 20-40 No. 440....." 72-00
No. 210....." 21-00 No. 445....." 78-00
No. 215....." 21-50 No. 450....." 84-00
No. 220....." 22-00 No. 455....." 90-00
No. 225....." 22-50 No. 460....." 96-00

Patent Stove Platforms.

To avoid confusion in ordering, each shape has a name, so that by giving the name, size and quantities wanted, no mistake can occur.

The "Sun" Round Zinc.

Sizes and Prices.

Inch.....24 26 28 30 32 34 36
Per doz.....\$12-00 12-50 13-00 13-50 14-00 14-50 15-00

The "Eureka" Square Zinc.

Sizes and Prices.

Inch.....24 26 28 30 32 34 36
Per doz.....\$18-00 21-00 24-00 27-00 30-00 32-00 34-00

The "Imperial" Square Zinc—Wood Bottom.

Sizes and Prices.

Inch.....24 26 28 30 32 34 36
Per doz.....\$36-00 38-00 40-00 42-00 44-00

The "Banner" Oblong Zinc—Wood Bottom.

Sizes and Prices.

Inch.....26x32 28x34 30x36 32x38
Per doz.....\$24-00 26-00 28-00 30-00

Jewett's Patent Crystal Spring Filter, with Porcelain Lined Cooler.

Patented November 16, 1869.

No. 1, Reservoir, 4½ quarts.....each, \$7-00
No. 2, " 7½ "....." 9-00
No. 3, " 11 "....." 11-00
No. 4, " 16 "....." 13-25
No. 5, " 26 "....." 16-50

Ornamental Style.

No. 01, Reservoir, 4½ quarts.....each, \$7-50
No. 02, " 7½ "....." 9-50
No. 03, " 11 "....." 11-50
No. 04, " 16 "....." 14-25
No. 05, " 26 "....." 17-50
No. 06, " 36 "....." 20-50
No. 07, " 46 "....." 23-50
No. 08, " 56 "....." 26-50

Nos. 7 and 8 are furnished with Self-Closing Faucets, elegantly Decorated.

Children's Table Trays.

Patented May 12, 1865, reissued May 11, 1869, and Feb. 6, 1872.

Fancy, with Hook.....Per doz. \$9-00
Extra Fancy, with Hook, reduced to.....10-00
We only make Child Trays with Hooks, as they are the only kind wanted of late.

The Hooks are a great improvement, holding the Tray fast to the table.

Regulator Plate Warmer—Grained Oak, Red Band.

One Size.

23 in. high, 15½ in. wide, 10½ in. deep, \$3-00 each, net

Regulator Fender.

Assorted Colors.

No. 1, 13½ in. high, 15 in. wide, 7 in. deep, \$1-00 each
No. 2, 17 " 18 " 9 " 1-50

The Best Cheap Bird Cages in the Market.

Good Quality and Thoroughly Enamelled.—White Earthen Seed and Water Cups.

No. 0, 38 Wires.....Per doz. \$7-50
No. 01, 41 "....." 8-25

Improved Flower Vase with Water Reservoir—Patented.

Prices Reduced.

No. 10, Height 9½ in., Diameter 7½ in., per doz. \$13-00
No. 12, " 11½ " 9½ " 17-00

Patent Reservoir Hanging Baskets.

Prices Nos. 1 and 2.....Per doz. \$12-00
Prices No. 3....." 10-00

Grass Brush and Tray.

Assorted Colors, Finely Decorated.

Price reduced to.....\$7-50 per doz., net

In our issue of last week we noticed the new Catalogue of G. B. Walbridge & Co. The following is their discount sheet, which is now ready for distribution. In a preface to their Catalogue they say: "We have also added largely to our list of Agencies. We are headquarters for all the goods we represent, the manufacturers establishing their Agencies with us, at their own expense, for the convenience of their customers, and we guarantee the prices quoted by us to be the lowest factory rates. Goods will be shipped from store or factory, as may be most to the advantage of our customers."

discounts FROM G. B. WALBRIDGE & CO.'S CATALOGUE OF AUGUST, 1875.

Prices subject to change without notice. Goods marked "Special" are subject to Special Prices on application.

Solid Spur Auger Bits.....dis 30¢
Diamond Auger....." 25¢
Dowel....." 10¢
Handled Auger....." 40¢
Machine Bits....." 40¢
Spoke Shaves....." 40¢
Cuban Augers.....No. 1.....40¢
Short and Eye Augers.....special
Boring Machine.....40¢
Diamond C. S. Augers.....No. 1.....40¢
Cuban Augers.....No. 1.....40¢
Short and Eye Augers.....special
Boring Machine.....40¢
Diamond Patent Screw Wrenches.....40¢
Always Cool Stove Lid Lifters.....net
Diamond.....40¢
Upjohn Door Bolts.....40¢
Punching Presses, Lyon's Patent.....20¢
Plate Iron Shears.....20¢
Combined Punch and Shears, Lyon's Patent.....20¢
Self-Feeding Drills....." for Hand, " list
Blacksmith's Drills....." 20¢
We continue to manufacture our Door Knobs of the different woods as heretofore, and have added to our assortment, goods finished in Black and Bronze, as something unique, beautiful, and worthy your attention.

The price of our new Bronze and Jet Knobs is \$25 per dozen, with our regular discount off.

Very respectfully, yours,
ORNAMENTAL WOOD CO.

PHILADELPHIA, July 30, 1875.

DEAR SIR: The American Screw Co., of Providence, R. I., having announced that their prices will, within a short time, be greatly reduced, we desire to say to our customers, and all others interested, that our prices will at all times be as low as may be made by the agents of the American Screw Co.

We are also prepared to furnish our Steel Screws, either bright or annealed, in any quantity, guaranteeing them to be of greater strength and durability than any Iron Screw manufactured.

Our circulars, with new prices, will be issued as soon as practicable, and until same shall be received you may depend upon receiving our Screws at the same quotations which may be published by the American Screw Co's. Agents.

Respectfully Yours,
NEWLIN & YARDLEY,
Agents for Union Steel Screw Co.

Macomber, Bigelow & Dowse, Boston, Mass., have issued the following revised list for Young's Improved Silver Glass Knobs. An examination of the old and new prices given below shows that all the changes are advances on former prices. The trade discounts remain as before, and are as follows:

Less than 6 dozen.....dis. 45¢
6 dozen in one order....." 45¢
12 dozen in one order....." 45¢
REVISED PRICE LIST OF YOUNG'S IMPROVED SILVER

ing establishments there were altogether in 1873 38, employing 5775 hands, 35 works being Prussian, and one Saxonian. The following have been the quantities of metallic Spelter produced:

Cwts.	1868	Cwts.	1873
1,206,369	1,222,625	1,206,369	1,222,625
1,184,956	1,189,169	1,184,956	1,189,169
1,139,802	1,170,171	1,139,802	1,170,171
1,304,419	1,165,943	1,304,419	1,165,943
1,277,470	1,167,742	1,277,470	1,167,742
Average annual production, 61,679 tons, English.			

(Drontheim.)

HAMBURG, July 24, 1875.—Metals.—Consumptive inquiry during the week has not been brisk; it has, therefore, been easy to fill current requirements. Copper.—The Berlin market is quiet at 91 to 93 marks the 50 kilo English and Austrian. Stettin remains steady at 96 to 100. No large dealings have transpired in this city; prices have remained unaltered as follows: Drontheim, 94; Minnesota, 110; and Quincy, 100 marks. Tin.—The German markets have been but indifferently supported. At Berlin, Banca has declined to 92 to 93, and English to 89 to 90 marks the 50 kilos. At Stettin, Banca is quoted 96 to 97. There has been no change here. We quote Banca and English refined between 94 and 100 marks. Lead has been uniformly firm. At Berlin, Tarnowitz, Hartz and Saxonian remain 23 to 24 marks the 50 kilos. At Stettin German Lead is quoted 24 to 25; Spanish, 27. Here the market has remained steady at 23 to 24 for German, and 25 to 26 for English. Spelter.—The firmness in this metal continues. At Berlin good brands Silesian bring from 24 to 25 marks the 50 kilos. At Stettin there is an extensive export demand at Stettin at 24 to 25. Breslau remains quiet and firm. There are sellers here at 24 to 25 marks.

HOLLAND.

(Koch & Thierbooms.)

ROTTERDAM, July 27, 1875.—Tin.—The market is quiet, pending the company's sale to-morrow. Spot Banca is scarce, and holders decline to part with it at anything below 50 guilders. Previously delivery from to-morrow's sale had sold at 49½ to 49¾. Billiton, spot, has sold at 47 to 47½; it continues to be offered at 47, without purchasers. September delivery of Billiton comes, we think, be obtained at 46½. Lead is quiet at 13 guilders.

EAST INDIES.

(Allen, Spence & Co.)

COLUMBO, Ceylon, June 26, 1875.—Pumabago.—The weather has lately been more favorable for preparing operations, but dealers are augmenting their stocks, which are small, and the demand continues limited. The Marie Louise's cargo has been landed in a damaged state, and will be sold at auction for underwriters' account. We quote Lump, 380; Chip, 180, and Dust, 120, all per ton on board per ton, with-out freight and commission. Freight to New York, 70. The market closes quiet, but steady. Shipments from this island to the United States, from October 1, 1874, to date, have amounted to 24,680 last year; to the United Kingdom, 49,822; to the Continent, 1448, and to Australia, 97, making in the aggregate 77,142 thus far this season. Exchange, 1/10½ to 1/10.

CHINA.

(Arnhold, Karberg & Co.)

CANTON, June 18, 1875.—Metals.—No business to record. Dealers are offering 77 to 77½ for L. B., but there are no sellers at these figures. Tin is saleable in small lots at former rates. Quicksilver.—The market has been unsettled throughout the past fortnight, and sales have been effected at rates ranging from \$107 to \$115 per cwt.; just toward the close, however, a spot has taken place in consequence of supplies by the City of Peking being far less considerable than was anticipated, and prices suddenly advanced to \$128 and \$125 per cwt. In distant supplies some business has been done yesterday at \$100 per cwt. for delivery within four weeks. We quote Lead, \$7 to \$7½; Tin, \$22 to \$24½, and Quicksilver, \$120 to \$125. Exchange on New York, 5 per cent. discount.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., July 26, 1875.

THE FLOODS

have again descended since I last put pen to paper on your behalf, and have literally covered the "face of the earth" with their accumulated waters in most of the valleys and low lying localities. In the Southern, Eastern and South Midland districts the havoc wrought by the protracted rains is very serious indeed, and threatens to prejudice the results of the whole cereal and potato harvests. The hay was ingathered in some places, but in many others whole ricks, or the loose grass as it lay in swathes in the fields, have been carried off by the turbulent overflowing of the brooks and rivers. The corn has naturally fared worse; indeed, reports from Lincolnshire and Cambridgeshire, two of our finest agricultural counties, state that the damage done is incalculable and irretrievable. The wheat and oats were on the point of ripening, and should, in the ordinary course, have been ready for cutting three weeks later. The rains, however, have beaten them down flat, and the heavy crops are now so twisted about that they must necessarily be cut by hand, no machine yet before the public being able to deal with such a complicated state of affairs. The wholesale destruction in many parts of the kingdom has been disastrous, but the weather has now become hot. The consequence of this will be that the wheat "laid" in the manner described above will sprout or mildew, and become, in a great measure, worthless. On the light sandy soils the potatoes will, perhaps, not suffer very greatly, but on rich loam or clay bottoms, where the moisture is still lingering in quantity, the tubers will become what the farmers call "steamed," and they will go bad with the very greatest rapidity. I lament all this because

THE IRON TRADE

is very mercifully affected by our harvest prospects and realty. Given a fine summer, and a consequent abundant harvest, and some benefit to the iron and hardware industries is sure to follow in due course. The contrary agricultural effect produces a corresponding manufacturing depression, particularly when it occurs in conjunction with a similar state of affairs in other parts of the world. Corn has gone up 8 to 10 per quarter (two sacks of about 16 to 18 stones each) in the course of the past week, but is now a little steadier pending the cessation of hostilities on the part of Jupiter Pluvius. I cannot, of course, pretend to say with an absolute certainty that the gloominess which I have just referred to is having the effect of causing a still greater depression in the iron and coal trades of the Kingdom, but I do affirm that things appear to grow more subdued every week. Prices are unblemished down, if I may be permitted to make use of so commonplace an idiom—in all directions, yet the expected buyers don't, and apparently have resolved that they won't, make their appearance. Some of the merchants affect to be possessed of important commissions, and hint mysteriously at what they might do should prices come down another £1 for finished iron, but they do not condescend to details, hence the

majority of the producers begin to lose both faith and heart in the weary waiting for the good time coming. Coming it may certainly be, but it is clearly not nigh, and no signs of its approach can be detected even by the most acute observer. Everything is vague. There are no definite premises wherefrom one might draw useful or hopeful inferences, so that the coal owners and iron manufacturers, being alike in the dark as to the future, continue to put their faith in Providence—and get down their workmen's wages as low as possible.

WRECK OF THE ABBOTSFORD.

The Abbotsford—an unlucky vessel, by-the-by, from the very outset of her career—one of the largest steamers of the American Steamship Company, has come to grief off the Welsh Coast. She ran ashore off Anglesey, on Wednesday last, in the Bay of Cemmaes, in a dense fog, which baffled the keen vision of the licensed pilot who had charge of the vessel. She stuck fast on a rock, and the passengers were immediately landed. The Liverpool Post says:

"Hopes were entertained that the Abbotsford would be got off without much injury, and lighters, steamers, and steam pumps were forwarded from Liverpool to her assistance. Unfortunately, these have proved of no avail, a telegram having been received yesterday by Messrs. Richardson, Spence & Co., the owners' agents in Liverpool, informing them that at 10 o'clock yesterday (Friday) morning the steamer heeled over and sank in seven fathoms of water, in which she now lies, with her decks at an inclination of 45°, her bow being dry at low water. At half tide the four main hatchways are out of water, as well as the three forward winches. It is expected, however, that a large portion of the cargo can be saved, and also the ship's gear beyond the bridge. At low water men are engaged removing the cargo. The Abbotsford was built at Port Glasgow, in 1870, was about 1500 tons register, and her engines were 100 horse-power, nominal. The ship and cargo were roughly estimated at £120,000, the value of the ship itself being £70,000. The insurance was principally effected in Glasgow, so that the loss to Liverpool underwriters will be comparatively small. Some London and Paris firms will also be involved. The steamer has been peculiarly unfortunate during the last year or two. Some time ago she came into collision with another vessel shortly after leaving London for Philadelphia, and had to put back to the former port, and while waiting there small pox broke out on board. On a subsequent voyage from Liverpool her cargo broke, necessitating the Abbotsford again to return. Had no accident occurred at this time the steamer would have sailed for Philadelphia in the ordinary course on Wednesday next."

THE INFLEXIBLE.

Iron gives the following description of this iron-clad, which is expected to be ready for launching in April next:

"The Inflexible has been succinctly described by her designer, Mr. Barnaby, as a rectangular armored castle, 110 feet in length and 75 feet in breadth, and protected by 24 inches total thickness of iron. The other parts of the ship, which are not armor plated, are simply used as means to float and move this invulnerable iron citadel. Altogether the Inflexible is 330 feet in length and 75 feet in breadth. Her mean draught is 24 feet, and her displacement 11,000 tons. All the longitudinal frames are made of steel. The outer skin plating is three-fourths of an inch in thickness, except the garboard plates on each side of the keel, and here the thickness is increased to thirteen-sixteenths of an inch. The armored castle or citadel, which rises to 10 feet above the water-line of the vessel, will enclose within the protection of its walls the engines and boilers, the two turrets with their four 80-ton guns, the hydraulic loading gear, and the magazines. The armor of the citadel will be of different thicknesses of iron, making, however, with the teak backing—which will vary inversely to the thickness of the plating—a uniform thickness of 41 inches throughout. The backing will be interposed sandwich fashion, the armor alternating with a strake of wood. The plating at the water level will be 24 inches, in two thicknesses of 12 inches; above the water level it will consist of two thicknesses of 12 inches and 18 inches, while below the water level it will be reduced to two thicknesses of 12 inches and 4 inches. The turrets themselves will be formed of iron of a single thickness of 18 inches. The deck will be formed of 1 inch iron, supporting armor plating 2 inches in thickness. The ship proper, being entirely armored, will be divided into no fewer than 127 watertight compartments, containing altogether somewhere about 150 watertight doors, but having none of the armor bulkheads of the Devastation. Other novel features in the design of the ship are the position and extent of the superstructures, which are erected upon the deck at either end of the citadel, the position of the turrets and the disposition of the guns. The superstructures will be built up along the line of the keel forward and aft of the armored castle, and are intended to afford sleeping accommodation for the officers and crew. The turrets of the Inflexible, however, are placed out of the center, the fore turret being on the port side of the ship, and the after turret on the starboard, so that the four guns can be discharged together in line at an enemy right ahead or on either beam, or in pairs astern and toward every point of the compass. The whole of the steam steering gear is placed below the water line, so that it is impossible that the rudder-head, although unprotected by armor, can be injured by shot or shell during an engagement. The rudder, which is squarely formed, will be worked by a tiller 4 feet 6 inches below water. The propeller is a massive and very dangerous looking tubular one, and will be wholly under water. As originally designed, it was made to be removable, being placed in position only in case of war. This arrangement, however, has been revised, and it is now decided to fix it permanently. It has been lately detached for alteration, the curve of the nose having been considered too abrupt. The coils, of which the Inflexible will carry the enormous quantity of 1200 tons, will be stored at the water line along the unarmored sides of the ship, where the missiles of the enemy cannot reach them, and a still more secure place will be found below for more perishable stores. The armor plating will not be placed on the citadel until after the vessel has left the slips and been floated into No. 13 Dock, which is being prepared for her in the extension works. When completed, the Inflexible will have more machinery on board than any craft afloat, not excepting the Thunderer. She will have engines for propulsion, ventilation, hoisting, moving turrets, loading guns, steering, lifting shot and shell, turning capstan, lowering boats, &c., &c. The whole of which will be supplied by the Scotch firm of Elder & Co. She will be a vast floating engine room, and when commissioned will have as her complement 350 officers and men. The expense of her construction is £400,000, making, with her engines, a total cost of £521,000."

THE SCOTCH PIG IRON MARKET.

There has been a good deal of holiday making in Scotland during the past week, consequently the transactions in pig iron have been on a limited scale compared with the few weeks immediately preceding. Warrants have continued steady at from 60 to 60½. The shipping total for the week has been 9833 tons, makers brands having been unaltered in price. There

are now 32,500 tons in Connal's stores. Freight is unchanged, as also is ballast pig iron.

Writing from Glasgow, on Friday night, July 23, Messrs. James Watson & Co. said: "The warrant market during the past week has been very steady, from 60 to 60½ cash, closing to-day buyers at 60½, sellers at 60½. The demand for makers' iron has also been quiet, with very little alteration in price. Shipments last week were 9833 tons, against 9944 tons in the corresponding week of 1874." We quote:

G. M. B., at Glasgow.	No. 1.	No. 3.
Gartsherrie, "	61/6	60/
Coltness, "	60/	61/6
Langloan, "	61/6	60/
Langloan, "	61/6	60/
Calder, at Port Dundas.	61/6	60/
Glenarnock, at Ardrossan.	61/6	60/
Eglington, "	61/6	60/
Dalmellington, "	61/6	60/
Snotts at Leith.	61/6	60/
Kinnell at Boness.	61/6	60/

Messrs. John E. Swan & Bros. (Limited) prices current of the same place and date gave the following information:

Glasgow Brands.	Furnaces.	Wrought.	Cast.	Prices.
				No. 1. No. 3. No. 4.
Gartsherrie.....	13	3	16	63/ 61/ 63/6
Coltness.....	12	0	12	69/ 68/6
Summerlee.....	6	2	9	65/ 61/ 64/
Langloan.....	7	1	9	66/ 61/6 64/
Govan.....	4	1	5	61/ 60/ 62/
Calder.....	2	6	8	67/6 61/ 64/
Shotts, "Bessemer"	5	2	7	62/6 61/ 64/
Carnbroe.....	4	2	6	63/6 61/ 64/
Wishaw.....	2	1	3	61/ 60/ 60/
Monkland.....	9	0	9	61/ 60/ 60/
Blackhall.....	6	0	6	61/ 60/ 60/
Clyde.....	4	1	5	61/ 60/ 60/
Quarter-Clyde.....	4	1	5	61/ 60/ 60/

* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 60/6.

WEST COAST BRANDS—f. o. b. Ardrossan.

Glenarnock.....	7	2	9	66/6	61/6	62/6
Ardre.....	4	1	5			
Eglington.....	6	2	8	61/	60/	61/
Lazar.....	4	0	4			
Muirkirk.....	0	0	3	61/	59/	59/
Portland.....	3	3	6			
Dalmellington.....	6	2	8			

EAST COAST BRANDS—f. o. b. in the Forth.

EAST COAST BRANDS— <i>f. o. b. in the North.</i>						
Kinnell.....	3	1	4	62/	59/	59/
Almond.....	2	1	3	62/	59/	59/
Carron { Selt'd }	5	1	6	67/6	..	..
{ Ord'n }				65/	..	..
Lochelly.....	0	4	4	..	59/	59/
Lumphinnans.....	0	3	2	..	..	..
Bridgess.....	0	3	2	..	..	..

Messrs. Wm. Colvin & Co. (Glasgow, July 27) said: "The warrant market has been exceedingly inanimate during the past week, but the price has remained very steady at 60 to 60½, for prompt cash. To-day the demand has been languid, the market closing with sellers at 60½. There is not much alteration in the prices of makers' iron, but the tendency at the moment is rather downward, as under:"

G. M. B., at Glasgow.	No. 1.	No. 3.
Gartsherrie, "	61/6	60/
Coltness, "	60/	61/6
Langloan, "	61/6	60/
Langloan, "	61/6	60/
Calder, at Port Dundas.	61/6	60/
Glenarnock, at Ardrossan.	61/6	60/
Eglington, "	61/6	60/
Dalmellington, "	61/6	60/
Snotts, at Leith.	61/6	60/
Kinnell, at Boness.	61/6	60/
Bar Iron, "	61/6	60/
Nail Rods, "	61/6	60/

SHIPMENTS.

Week ending July 24, 1875.	Tons.
July 25, 1874.	11,282
July 26, 1875.	8,488

TRADES OF SHEFFIELD.

The shareholders of the Phoenix Bessemer Steel Company (Limited) met at Sheffield at the end of last week in order to consider the question of raising a sufficient amount of capital to enable the operations of the company to be carried on. It will doubtless be remembered that the company suspended payment on June 3d, with liabilities estimated at about £140,000, and assets about £24,000. These liabilities were, of course, outside the share capital, of which £80,000 were called up. At the time when the suspension took place, a scheme of reconstruction by means of raising an additional £80,000 of capital was nearly completed, most of the principal shareholders having put down their names. The stoppage necessarily put an end to this scheme, but since the filing of the petition in Chancery there has been a pretty generally expressed opinion that an effort should be made in order to prevent the concern from drifting into a state of comparative inertness, and if it were found possible to bring about its resuscitation. It was with the latter intention that last week's meeting was held, Mr. John Aizlewood, a shareholder, and also a creditor, presiding. It was mentioned last week that certain offers of about 12/ in the pound had been made to the creditors' committee by the shareholders' committee, to pay which composition part of the existing liabilities was to be raised. After a considerable amount of discussion amongst the shareholders present, it was determined to raise the sum of £100,000 for the purpose of resuscitating the company in preference shares, to bear interest at the rate of ten per cent. per annum, the existing shareholders being requested to take up the new capital *pro rata* to their present holdings. Since the meeting the shareholders have responded very well, and the applications at present received lead to the belief that the whole amount will be taken up.

The iron trade proper in the town and the surrounding districts of South Yorkshire and Northeast Derbyshire does not alter in any material degree, the prevalent feeling being quite as dull and cheerless as it has been any time during the last six months. Pig iron is still being pretty freely produced at the local furnaces, but the sale is in the main quiet, and it would appear that the output is in excess of present requirements. Such establishments as Sheepbridge, Thorncliffe, Elsecar, and others used most of their own pig on the premises, and do not come into the open market. Other producers, however, are understood to be trying to extend their connection in Staffordshire and Lancashire, but the measure of success with which their efforts in these directions had certainly been rewarded is likely to receive a check since the reduction in price in Shropshire, Worcestershire and Staffordshire. Local pig is, nevertheless, a little easier in price, and may shortly again be heard of in the markets just alluded to. Merchant irons of the best brands—Bowling, Low Moor, Kirkstall, Forge and Butterley—are selling pretty freely for

engineering and general machine purposes, but the common and medium irons do not meet with a very encouraging call. Common bars are still quoted at about 28 at the works; fair medium, 29 to 29½; and J. B., 212. Low Moor iron is unchanged in price in all qualities. Hematite pig irons are being brought here in small lots for Bessemer purposes, and are not kept at the following figures: Maryport "Hematite" No. 3, 80; No. 4, 80; No. 5, M and W, 80; "Bessemer" No. 1, 85; No. 2, 82½; and No. 3, about 80, all per ton; Millom "Bessemer" No. 1, 83½; No. 2, 80; and No. 3, 77½; "Ordinary" No. 3, 85; No. 4, 84; No. 5, 90; M, 85; and W, 82½ per ton, with usual allowance for cash.

Some of the engineering establishments are doing a fairly large amount of business, and have their books tolerably well filled up. Davy Brothers & Co., Limited, have just paid a dividend of 15 per cent., and have as much engine work in hand as they can well get through in the ordinary way. Much of it is on engines and plant for ironworks or collieries in the district. The York-Hire Engine Company is also enjoying a fair degree of prosperity, and is likely to become an exceedingly valuable property; the works of the company are now partially occupied on the manufacture of the Perkins engine for the Admiralty and other purchasers, and partly on Fairlie bogie engines for Peru. Several of these later locomotives are nearly complete, and will be sent off shortly. At other works of this description business cannot be said to be brisk, but is not bad. At Leeds most of the machinists are tolerably well engaged, and the engineering works—Messrs. Fowler's plow works amongst them—are fully occupied at present.

In the hardware industries the manufacturers continue to "hunt up" their customers pretty assiduously, by dint of which, with some little incentives in the way of prices, they manage to keep going. Thus, a good many of the branches, but in a few others a quiet amount of business is being transacted without so much pushing. The forthcoming royal visit to Sheffield is giving a little spirit to some branches, but, on the whole, it is not calculated to do much direct good to the local manufacturers, even of minor hardware. The visit takes place on August 16th and 17th, both of which days will, doubtless, be set apart as holidays. The coal trade is dull, and not very profitable. Production is being hindered at several pits by disputes with the men, whilst at others the men themselves are careful not to work too regularly, lest stocks should accumulate on the pit banks. Steam coal is 6d. to 1/ cheaper, and the Great Northern Railway Co. have reduced their tonnage rate from South Yorkshire to London by 6d. per ton, leaving the rate at 8/5 per ton, including the city dues.

There is nothing new or interesting to mention in connection with the cutlery departments. Some of them are just fairly going, others being unable to secure orders sufficient to find them more than three-quarter time. Messrs. Joseph Rodgers & Sons (Limited) have their showrooms, etc., "upside down" in preparation for the visit of the Prince and Princess of Wales to the establishment on August 17th. They will also visit other places of interest in the town, which is bestirring itself to give the Royal party a right loyal reception.

BIRMINGHAM AND STAFFORDSHIRE may this week be disposed of in a few lines. The iron trade is in all respects a shade easier; heavy metal castings being declared down 21 per ton. Sheets for galvanizing and light hardware purposes are in better request, but in this, as well as in all other respects, the amount of actual business transacted is pitifully small. The tendency of hardware prices is decidedly downward as is evinced by the following alterations: Malleable nails, 10 per cent. down; bright or annealed; selected spring and improved galvanized wire, 7d. per bundle lower; best charcoal galvanized wire, 2d. per doz. lbs. lower; drawn and rolling fencing wire and best best drawn telegraph wire is reduced 21 per cent.; fencing staples are down 1/ per cwt.; pick-axes, mattocks, large hammers, crow bars, cast steel mauls, potato and dung forks, and solid eyes for picks are 7½ per cent. easier; brass coils, 2½; pairs points, 1/ per cwt.; Demara and other hoes, as well as most kinds of shovels and spades, are 5 per cent. lower; Anvils, vices, axes, &c., have been gradually going down for some time past, and are now nearly 1/6 per cwt. lower on the quarter.

SOUTH WALES.

A meeting of the creditors of Messrs. Fothergill, Hankey & Co., until recently carrying on business at the Plymouth and Aberdare Ironworks, South Wales, was held last week. The balance sheet showed that the liabilities were £287,892, with available assets, deducting rents, &c., worth £204,000. The works were valued, however, as going concerns at £1,315,600, charged with mortgages and an annuity amounting in the aggregate to £317,000. The meeting was adjourned for a month to allow the completion of certain negotiations, which will, it is believed, result in Mr. Fothergill being permitted to resume the management and part, at least, of the iron works and colliery undertakings. It is understood that one of the largest creditors is in favor of this arrangement, and is inclined to accept a composition so that Mr. Fothergill may again become the owner on easy terms. This seems a feasible way out of the difficulty, as the gentlemen in question are undoubtedly very energetic and sagacious. The iron works and collieries are doing a little work, but it is only to keep the machinery from rusting.

THE METAL MARKETS

have been excessively dull and sluggish during the entire week, with the exception of quicksilver, in which some few considerable transactions have taken place in the London market. At scarcely any time have there been so few features of interest to note in connection with metals generally.

The Mining Journal remarks: "Copper.—The market for copper is very quiet indeed, and has been throughout the week. Quotations: Chili bars, g.o.b., usual cash terms, are quoted £79. 10/ to £80; English tough, 256; best selected, £87. 10/; sheet copper, 4x4, £90. 10/ to £91; strong sheets, £92; and yellow metal, 7½d. to 8½d. Lead.—This metal has been without alteration throughout the week, and is firmly held at previous quotations—good soft English pig, £22 to £23. 5/; and soft Spanish, without cover, £21. 10/ to £21. 15/; the latter—Silicon on the 2nd is quoted £23. 15/; and special brands at outposts £24 to £24. 5/. Quicksilver.—A large business has been done in this metal at £10 per flask, which is the closing price for Spanish. Tin Plates.—There is no change to report in the position of this metal, which is much neglected."

Messrs. Berger, Spence & Co.'s circular of to-day says: "There is no new feature to report in the copper market, quotations remaining unaltered; while the transactions in tin have been slightly in buyer's favor. Lead is still in good demand, and prices are fully maintained."

On the Uses of Steel.

By J. BARBA, Chief Naval Constructor, Lorient.

Those metals known to commerce under the names of cast iron and of steel owe their characteristic qualities to the presence of a certain quantity of carbon mingled or in solution with

the iron. The metals may also contain other bodies which more or less affect their properties; among these may be named in particular phosphorus, silicon, sulphur, manganese, &c. But none of these bodies are necessary to the constitution of cast iron or of steel, and it will be sufficient here to note that they exist in most of the irons of commerce without studying the considerable influence they may exercise.

Putting aside then all considerations relative to the presence of other foreign bodies, carbon exists in cast iron and steel and carburized iron either in solution or intimate mixture, without forming any clearly defined carbure.

Steel is formed by the solidified solution of carbon in chemically pure iron. These solutions in the liquid state are not saturated, with the one exception of that class of steel which contains the maximum amount of carbon that iron can contain in solution. Cast irons are saturated solutions of carbon in iron, with an excess of carbon in a state of mechanical combination. They may be defined as steel containing a mixture of carbon. The proportion of carbon in this state is as much greater as the amount in solution is less, or again as the total quantity of carbon contained is greater. Thus the black irons are steels slightly carburized, with a large proportion of mixed carbon, and gray irons are steels more highly carburized, with less mixed carbon.

The phenomena of the solution of carbon in iron necessary for the production of steel, may be referred to four principal laws, as follows:

1. The quantity of carbon which the iron can contain in solution increases as the temperature increases.
2. By slow cooling, a part of the carbon separates itself from solution, and remains in a state of mixture.
3. By rapid cooling, or by a sufficient exterior pressure, the greater part of the carbon remains in a state of solution. The rapid cooling acts in this case by the pressure resulting from it. If the carbon is mixed, an exterior pressure produces in it the solution of a greater or smaller proportion, according to its intensity.*
4. The temperature at which melted steel solidifies, decreases as the quantity of carbon augments.

These laws referring to carbon in solution in iron conform to the laws which rule the solubility of solids and gases in liquids. 1. The solubility of solids generally increases with the temperature. 2. When a solution made at a high temperature is cooled, a part of the solid separates itself. 3. The solution could probably be maintained under a sufficient pressure, but experiments have not been made to illustrate this, and indeed such an investigation would probably be very difficult, on account of the enormous pressure that would have to be employed. The solubility of gases increases with the pressure. 4. The solution generally assumes a solid form at temperatures decreasing with the intensity of the solution.

The rapid and slow cooling of heated steel constitutes its tempering and of annealing, operations that play an all important part in the employment of this material.

served in bars of cast steel the following variation:

	Natural State.	At Red Heat.	After Tempering.
Length.....	20.00	20.32	19.95
Breadth.....	1.00	1.03	1.01
Thickness.....	1.00	1.03	1.01
Volume.....	20.00	21.557	20.351

In these bars the length has decreased, and the breadth and thickness have increased; under the influence of interior pressure, the bar behaves like all homogeneous bodies subjected to deformation by the action of an interior force; that is, it tends to approach the spherical form. M. Caron quotes another example of a laminated steel bar.

In this example the tempering has still produced an increase of volume; but contrary to what occurred in the previous case the length increased and the others do not change. The reason of this contrast is evident, and is to be explained by the want of homogeneity in the laminated bar, which is susceptible of extension more easily in the direction of the lamination than in the opposite sense. The longitudinal fibers exceed their limit of elasticity before this limit has been attained in a transverse direction, and the augmentation in volume takes place entirely in the direction of length.

	Natural Condition.	After Tempering.
Length.....	20.00	20.43
Breadth.....	1.01	1.51
Thickness.....	3.70	3.70
Volume.....	111.74	114.35

Tempering should only produce the effects above described in homogeneous bodies whose composition does not vary with temperature and pressure. In steel and other carburized from the operation of tempering is complicated by the presence of the carbon, the solution of which it partially induces. It is difficult to ascertain whether the augmentation of volume observed in tempered steel is modified partially by this solution; continuing the comparison with the laws regulating the solubility of solids in liquids, it may be supposed that the increase of volume does not arise from this cause, because a solution has never so great a volume as the sum of the volumes of the bodies which compose it.

The solution due to the tempering of the steel produces a body possessing properties other than those characterizing it before tempering; but this body, owing to the rapid cooling, is always under the influence of phenomena which are developed by the operation. The pressure resulting from the two phases of the tempering maintains in solution a part of the carbon which would have been separated by slow cooling; this portion will increase, in proportion to the increased pressure, that is to say, as the tempering has been more rapid.

If a non-homogeneous body is tempered, composed for example of steels carburized in various degrees, the action will become complicated; it would seem probable that when the body is hot the carbon will be distributed irregularly, and that this dissemination will only increase under the influence of the pressure of the exterior cooled surfaces. If we suppose this body to be represented by various tints according to the quantities of carbon which it contains in different parts, the lines of demarcation, instead of being clearly defined as they originally were, will be found blended after tempering.

This phenomenon of the transference of carbon through iron or steel that has been raised to a sufficiently high temperature, has long been known. A bar heated with charcoal resolves the carbon at first over it, afterward it penetrates, and if the process of cementation be carried on long enough it will reach the center of the bar.

When pieces of steel of the same quality are tempered in different degrees the carbon is maintained in solution in a higher proportion as the tempering process is more active. To each nature of steel should correspond a degree of temper where the effect produced is a maximum, which would correspond to the point where the temper would induce the solution of all the carbon contained in the steel. If the effort of contraction were the same for all classes of steel the intensity of temper producing this effect ought to increase with the degree of carburization. But the contraction or pressure due to rapid cooling is generally insufficient to produce this result. The more the rapidity of cooling is increased the greater are the changes induced in the steel. The least carburized natures of steel alone are an exception to this rule; beyond a certain point the effect produced by increase of temper becomes nil, and changes in elasticity alone are observed. But in these bodies the limit of elasticity is attained under efforts relatively small, and the temper, by a variation of temperature, does not produce sufficient pressure to solve all the carbon.—Engineering.

(To be continued.)

The Hope Iron Works.

This institution is the latest addition to the list of San Francisco iron works, having just started active operations. Mr. W. W. Hanscom, formerly of the Elina Iron Works, is proprietor. The works are located on the corner of Minnesota and Santa Clara streets, on the Potrero, and cover a space of 100x200 feet. The main building is 40x100 feet, the machine shop taking up 80 feet, the pattern shop 50 feet and the blacksmith shop 30 feet. The offices and drafting room are at the extreme end of the main building, and are neatly fitted up. The foundry building covers a space of 40x100.

Mr. Hanscom has made a study of the proper arrangement of the works, so as to facilitate operations as much as possible, and make everything convenient for handling. In the foundry is a cupola furnace of six tons capacity, with a No. 5 Sturtevant blower. The pipe leading the air from blower to furnace is much larger than is usually considered proper,

but Mr. Hanscom says by the arrangement he has made, he gets as large a blast as if he used a blower two sizes larger with smaller pipe. Coke is used altogether for smelting purposes, and the screenings for fuel. This is found advantageous, and another industry is utilized.

In the machine shop the machinery is all new and first-class. The tools were made to order by Bement & Son, of Philadelphia, and are the best that could be procured. There are now four lathes in the shop and two on the way, from 12 inches up to 7 feet capacity, to turn from 10 feet up to 24 feet in length. There is also an 8 inch shaping machine and a 12 inch slotting machine. At present the works are run by a 10 horse-power engine for the machine shop and a 4 horse-power engine for the foundry. There are also two drilling machines, a bolt cutting machine, steam hammer, etc.

The shops are all arranged on one floor, to save the trouble of stairs. The buildings are lofty and well ventilated, and the different shops arranged in relative positions to accord with the usual progress of work.

These works have been running only about six weeks, but they already give employment to 25 men, and work is rapidly accumulating. Mr. Hanscom will make a specialty of stationary and marine engines. He has made a study of steam engine progress, and takes the greatest interest in their manufacture and work. He makes a style of vertical engines with a broader base than usual, in which several improvements are combined. The patterns and designs for this engine are now being made in the shop.

At these works there is now a hoisting engine under way for a Washoe mining company's prospecting operations; also a 35 horse power engine for a mine in Idaho. Mr. Hanscom is also building a launch engine which will be exhibited at the coming Mechanics' Institute Exhibition. The launch is 30 feet long by six feet beam. These works will make a specialty of marine machinery of all kinds, and Mr. Hanscom intends turning out some steam launches which will be a credit to California. He has grown up in California, and feels a natural pride in manufacturing articles of this class, which will show that California mechanics can do as well as those elsewhere.

No inconvenience is felt by the distance of the works from business centers. The town is rapidly growing over toward the Potrero, and before many years most of the iron works will probably move in the same direction. Many of the foundry men have talked of moving to the Potrero for some time, but Mr. Hanscom has taken the initiative. The idea he had in starting this shop was that all the shops were doing a great deal of general work and built everything, including engines. If he makes a specialty of engines he is confident that he can build them cheaper than shops which do not. As good work is required in this line here as in any part of the United States. The people here expect more work out of an engine than is usually the case. In order to compete successfully with other firms, Mr. Hanscom bought the best tools possible, with no regard to cost, and engaged the best workmen, in all departments, that he could procure. With good tools, good workmen, a convenient shop, pride in his work and long experience, he is confident that he can build up a successful business, and turn out work which will reflect credit on himself and our home industries.—San Francisco Scientific Press.

Tests of Rails at the Roane Iron Co's Mill.

The Chattanooga Commercial thus describes the testing of rails made by the Roane Iron Co. for the Cincinnati Southern Railroad; these rails are thirty feet in length and weigh sixty pounds to the yard:

The first test was on a four-foot section. Seven and one-half tons pressure, applied by a hydraulic press, deflected the rail less than one-sixteenth of an inch. Fifteen tons gave three-eighths of an inch deflection, and the rail straightened when the pressure was removed, to within less than one-eighth of an inch of a true line.

At the second test a fresh rail was put in the press, and the "first dash" it got ten tons pressure, on the center of a four-foot section.

This was reduced to 7½ tons, and the rail was held in the press five minutes—deflection one-sixteenth of an inch. When the pressure was removed, the rail sprang back to within one-hundredth of an inch of a straight line. Next fifteen tons pressure was applied, and the rail held in the press five minutes. It deflected one-half inch, and came back to within three-eighths of an inch of a straight line, when the pressure was removed. A pressure of 22 tons was then applied, and the rail was bent out of line 3½ inches. Twenty-five tons bent it 4½ inches; and still there were not the slightest signs of breaking, or parting of the fibers. These pressures were all applied to the head, the bottom resting on blocks.

Mr. Bates then had the bent rail turned over and applied the pressure upon the bottom, at the angle. It then took a pressure of 18 tons to break the head through to the stem. Then the stem was broken down to the flange, or bottom; the rail placed on a support, so as to leave the point where it was broken projecting over. Several stalwart colored laborers took hold of the end that lay on the ground, raised it up about 2 feet and let it down again, 13 times, before the bottom was parted. And when this was done a gentleman present said he didn't know which the bottom iron most resembled—second growth hickory or rawhide.

These tests show an iron of most extraordinary bearing power. An examination of the head will convince any experienced iron man that the wearing quality is quite equal to the general tenacity of the rail under pressure. We have doubts if the steel rails contracted for by the trustees of the Cincinnati Southern outwear these iron rails. The head is just as hard as the Bessemer steel. This head is made of muck iron, pure and simple, rolled from blooms, into which no iron enters save the Rockwood pig.

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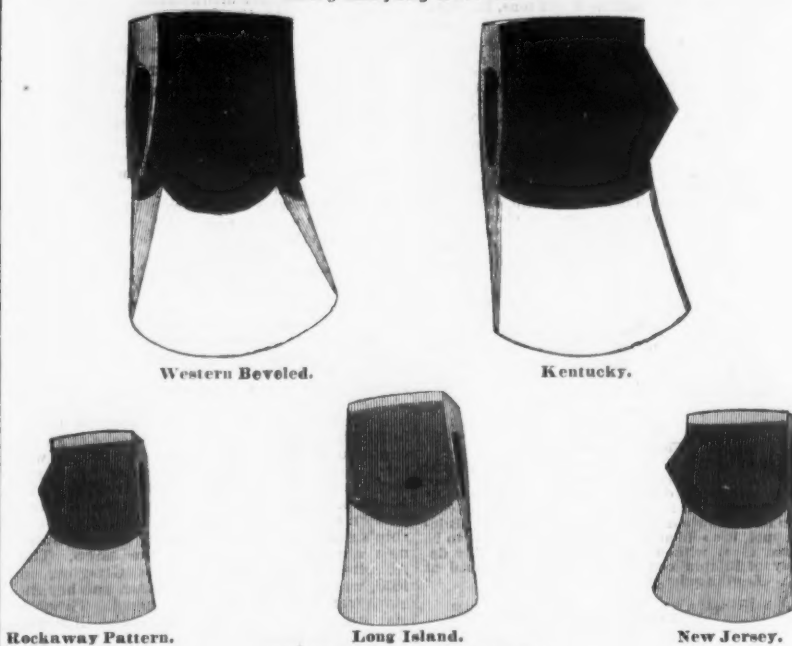
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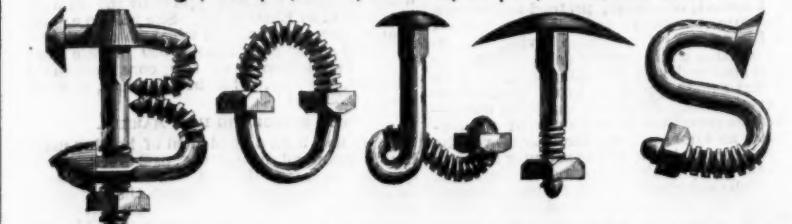
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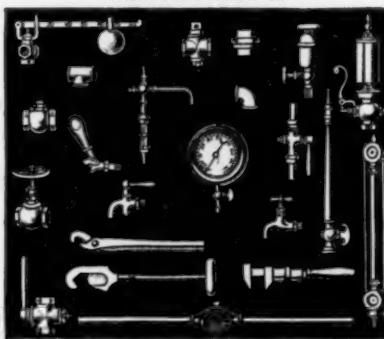
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We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality, compare favorably with our other well known brands.

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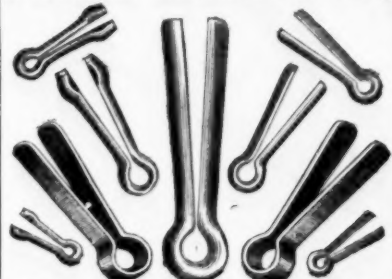
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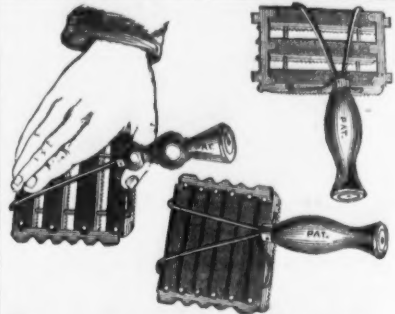
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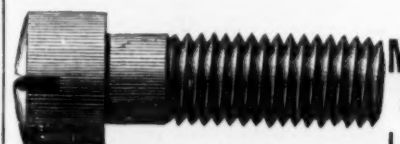
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HENRY DISSTON & SONS, Keystone Saw, Tool, Steel and File Works,

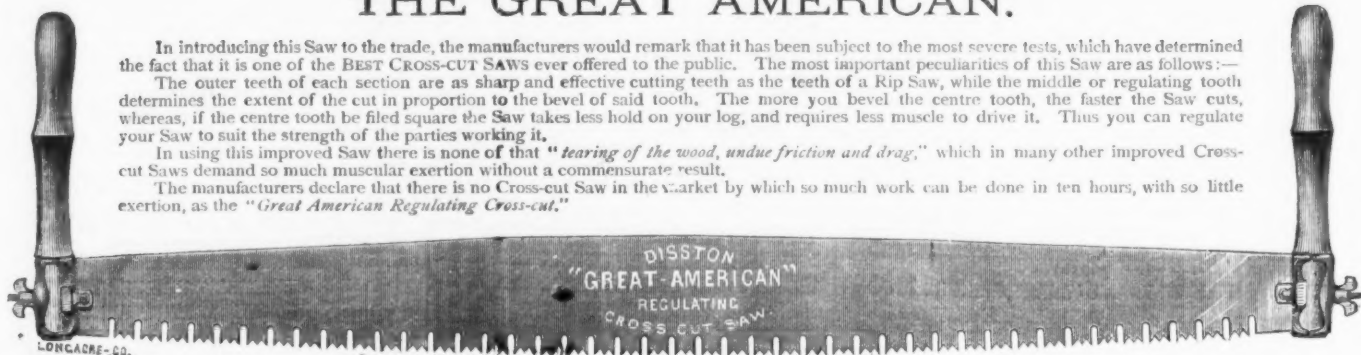
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Branch Works, Tacony, Philadelphia.

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Our Celebrated CROSS-CUT AND WOOD SAWS.

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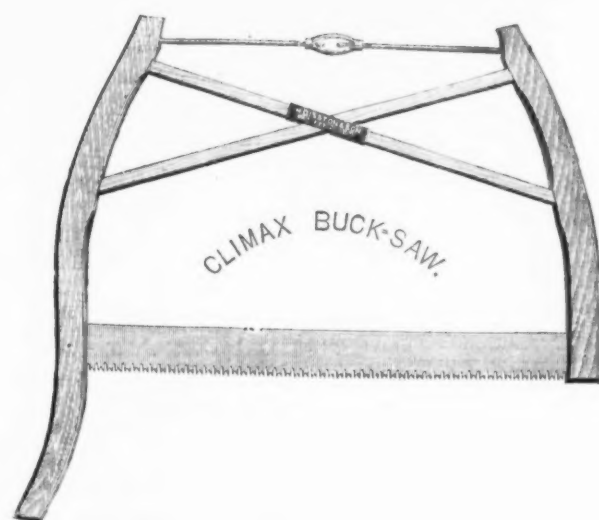


In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

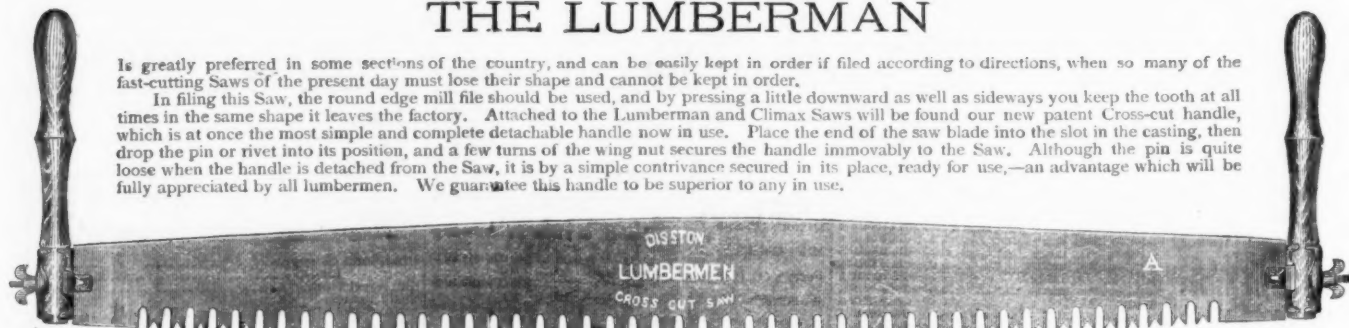
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."

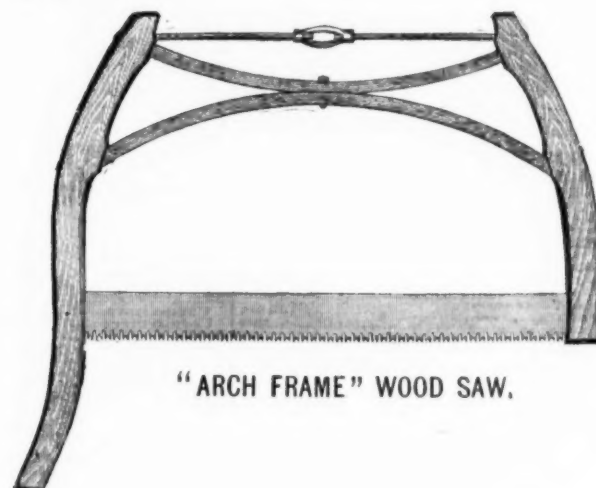


THE LUMBERMAN



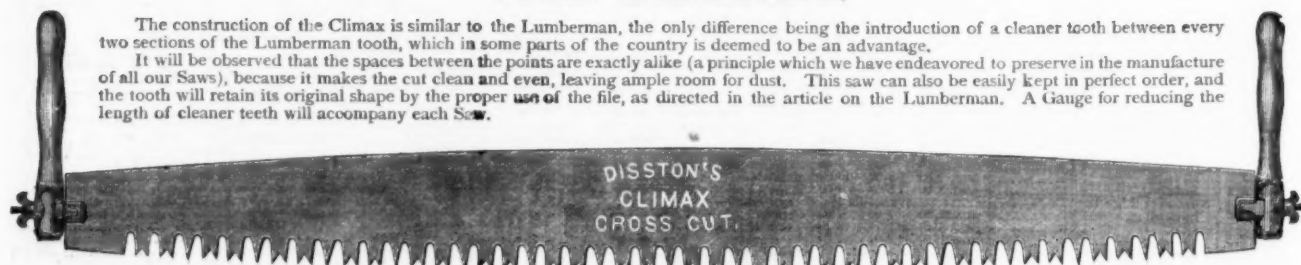
Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



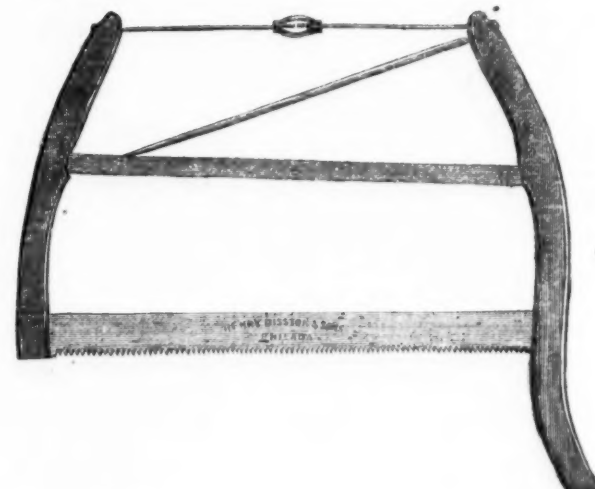
"ARCH FRAME" WOOD SAW.

THE CLIMAX.

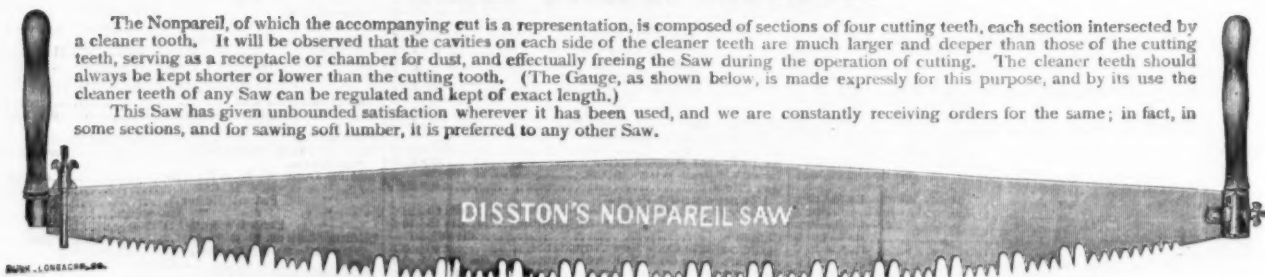


The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.



The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.

GAUGE FOR REGULATING CLEANING-TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in center of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



Showing the Gauge in Position for Filing the Cleaner-Tooth.



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3 1

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36 35	24 23	26x30 25

32	28	30x36
32	30	30x42
34	32	32x40
36	34	32x44
40	36	34x48

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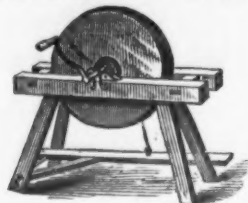
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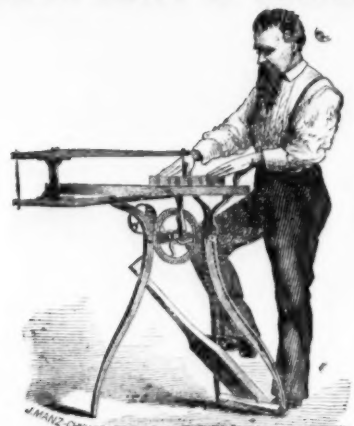
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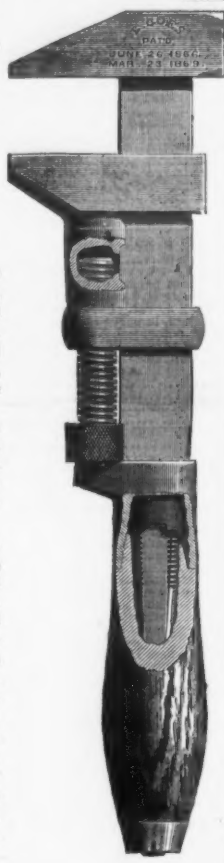
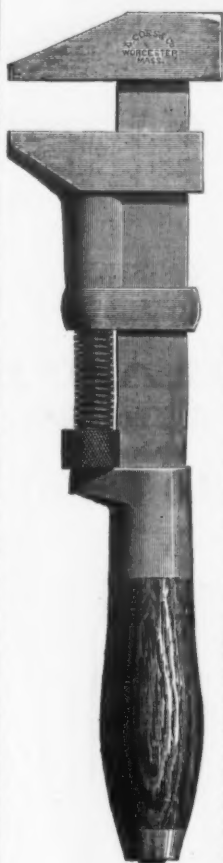
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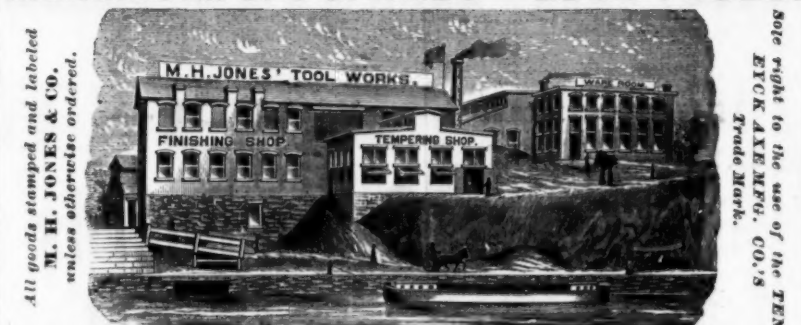
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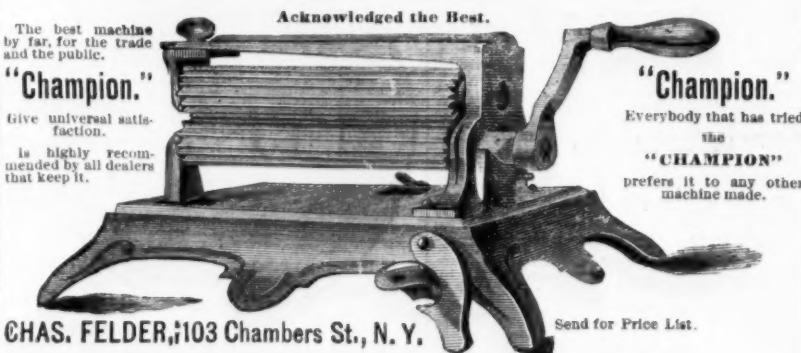
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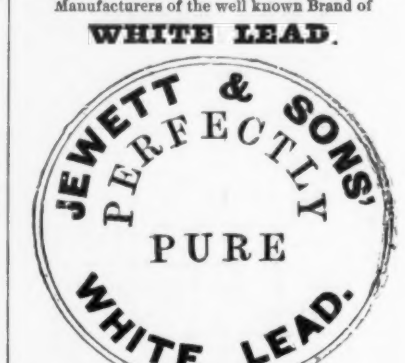
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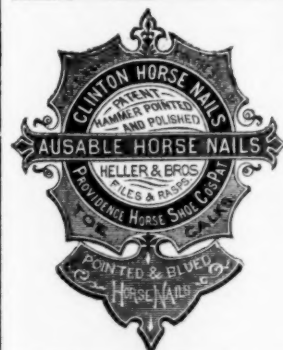
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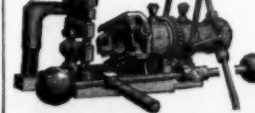
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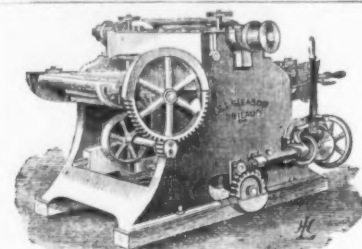
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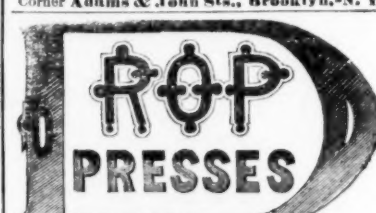
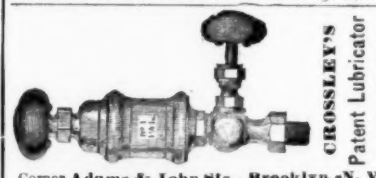
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Branch Office, cor. F and 7th Sts., Washington, D. C.**Bennett Hotchkiss and
N. C. Stiles' Patent.**

This Drop (which has been illustrated in this Journal) is of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of BENNETT HOTCHKISS (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C. STILES. Our improvements consist: First—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case. Second—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps situated under the rolls, so arranged that as the hammer rises they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.

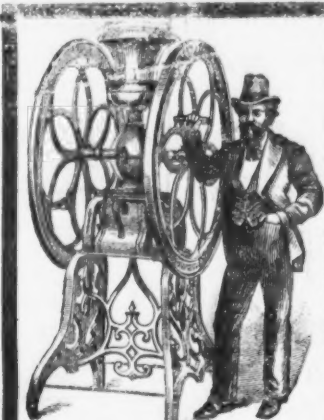
Third—The belt or board is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain any height of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less height than the collar is set for is required, work the hand lever, which will give you any height of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired height, so that the next blow can be given from a state of rest, of less height than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less height than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed. The clamps in holding up the hammer keep the board from touching either roll, and prevent the same from being worn uneven.

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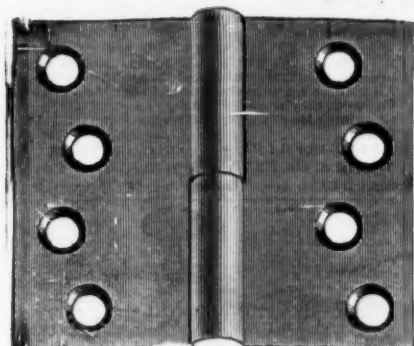
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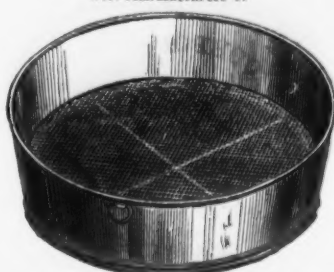


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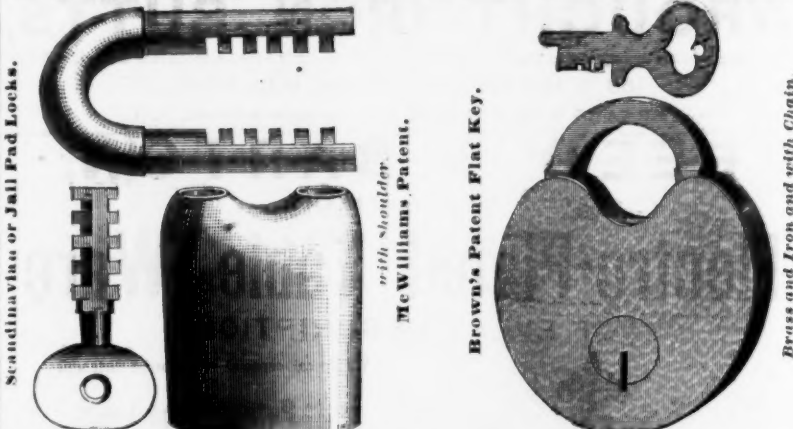
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Wilmington.....	11c
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Apple Parers. —Union.....	per doz \$7 50
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Donner.....	7 25
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Peach Parer.....	12 00
Acres. —Man's Light.....	per doz \$12 00
Red Indian, all sizes.....	14 00 to 12 50
Red Chertall, all sizes.....	12 50 to 12 00
Town Prince.....	12 00 to 12 00
Augers and Auger Bits. —Pierce's Pat.....	dis 30 c
West Bits.....	dis 30 c
Connecticut Valley Auger Bits.....	dis 30 c
Union & Co.....	dis 30 c
Jennings' Bits.....	dis 30 c
Bates' Nut Augers.....	dis 30 c
Donner & Co's Augers.....	dis 30 c
Watrous' Ship Augers.....	dis 30 c
Donner's Pat. Hollow Augers.....	dis 30 c
Stearns' Patent Hollow Augers.....	dis 30 c
Bathes. —Landers, Frary & Clark's.....	Sold on Morton's new
Chattillon.....	dis 50 c
Common Spring with Hook.....	per doz \$1 30 to 2 00
Bells. —Lewis Bros. Mfg. Co. Light Hand.....	dis 70 c
Common (Tissue Paper Weight).....	dis 70 c
Swiss Pattern.....	dis 70 c
Connell's Door Bell.....	dis 70 c
St. Western & Kentucky Cow.....	dis 30 c to 30 10 c
Boring Machines. —Bates' Mfg. Co., com.....	dis 30 c
Plate with augers.....	dis 30 c
Douglas Mfg. Co., complete with augers.....	dis 30 c
Common Boring Machines, no Augers.....	dis 30 c
Augers.....	dis 30 c
Bolts. —Eastern Carriage Bolts.....	special prices
Western.....	dis 60 c
Philadelphia.....	dis 60 c
Wrought Nutter, Stanley.....	dis 60 c
Braces. —Barber's.....	dis 60 c
Rackus.....	dis 60 c
Bartholomew & American Hall.....	dis 60 c
Spottard.....	dis 60 c
Butts. —East East Joint, Narrow.....	dis 30 c to 30 10 c
Cast Past Loose Joint.....	dis 30 c to 30 10 c
Acorn, Loose Pin.....	dis 30 c to 30 10 c
Mayers & Parliament.....	dis 30 c to 30 10 c
Acorn Jap.....	dis 30 c to 30 10 c
Wrought Loose Pin.....	dis 30 c to 30 10 c
Table Hinges.....	dis 30 c to 30 10 c
Narrow.....	dis 30 c to 30 10 c
Loose Joint.....	dis 30 c to 30 10 c
Parker's Blind Butts.....	dis 30 c to 30 10 c
Shepard's.....	dis 30 c to 30 10 c
Garrettson's.....	dis 30 c to 30 10 c
Clark's.....	dis 30 c to 30 10 c
Lull & Porter's.....	dis 30 c to 30 10 c
Garrettson's Blind Butts Light No. 0.....	Discount 60 c
Lull & Porter Pattern.....	dis 30 c
Cherrytree Blind Butts.....	dis 30 c
Chains. —German Hammer.....	dis 30 c
Beatty's Framing and Firmer.....	dis 30 c
Galvanized Pump.....	dis 30 c
Best Proof Chain.....	dis 30 c
By the case, 500 lbs.....	dis 30 c
Chisels. —Socket Framing.....	dis 60 c to 60 10 c
Socket Firmer.....	dis 60 c to 60 10 c
Tang.....	dis 60 c to 60 10 c
Beatty's Framing and Firmer.....	dis 60 c to 60 10 c
Casters. —Iron Bed.....	dis 30 c to 30 10 c
Porcelain Wheel Bed.....	dis 30 c to 30 10 c
Iron and Brass Wheel Plate.....	dis 30 c to 30 10 c
Porcelain Wheel.....	dis 30 c to 30 10 c
Clothes Wringers. —Universal.....	per doz \$12 00
Novaty.....	dis 30 c
Discount on 2 dozen lots, \$2 per dozen.....	dis 15 c
Coffee Mills. —Common Box and Side.....	dis 15 c
Patent Box and Side.....	dis 15 c
Cutlery. —American Pocket (best).....	dis 25 c
Landers, Frary & Clark's.....	dis 25 c
Goodnow Mfg. Co. Manufacturers' net price.....	dis 60 c
Drawing Knives. —Hart Mfg. Co.....	dis 60 c
Adjustable Hammer.....	dis 15 c
Beatty.....	dis 15 c
Fry Pans. —Tinned.....	dis 40 c to 45 c
No. 0.....	dis 40 c to 45 c
Burnished.....	dis 40 c to 45 c
No. 0.....	dis 40 c to 45 c
Files. —Sawmill Mill Files.....	new list
Bestard.....	dis 25 c to 25 10 c
Butcher's Mill (Advanced March 9th).....	dis 25 c to 25 10 c
Bestard.....	dis 25 c to 25 10 c
Taper.....	dis 25 c to 25 10 c
Flating Machines. —K. F. M.....	dis 15 c
Mrs. Knox—in rolls, \$50.....	dis 30 c
—in rolls, \$75.....	dis 30 c
Hammers. —Excess & Plumb's.....	dis 15 c
Hammond & Son's.....	dis 15 c
Verce.....	dis 30 c
Butcher's. —Beatty's.....	dis 15 c to 20 c
Shingling and Half.....	dis 15 c to 20 c
Yerkes & Plumb.....	dis 15 c
Shingling and Half.....	dis 15 c to 20 c
Claw.....	dis 80 c
Hinges. —Strap and T. (Changed March 21).....	dis 45 c
Horse Nails.....	dis 25 c
Globe.....	dis 25 c
Brundage.....	dis 25 c
Putnam.....	dis 25 c
On Anable, Gate and Brundage 1000 lbs.....	dis 5 c
Knobs. —Door, Mortise and Rim.....	dis 5 c
Makes in Combination.....	dis 5 c
Locks and Latches. —Rim and Mortise.....	dis 5 c
Till and Cupboard.....	dis 25 c
American Padlocks.....	dis 25 c
Scandinavian Pad Lock.....	dis 15 c
No. 0.....	dis 15 c
No. 0.....	dis 15 c
No. 0.....	dis 15 c
Trunk Locks. —Square Caudle and Oil.....	dis 10 c
Thumb and Rogers Latches.....	dis 10 c
Globe for Oil.....	dis 10 c
Lanterns. —Square Caudle and Oil.....	dis 10 c
Globe for Oil.....	dis 10 c
Mattecks. —Long and Short Cutlery.....	dis 25 c
Western Pattern.....	dis 25 c
Pennsylvania Pattern.....	dis 25 c
Messases Gates. —Measuring Faucets.....	dis 20 c
Stebbins' Gates.....	dis 20 c to 25 10 c
Lincoln's.....	dis 20 c to 25 10 c
Landers, Frary & Clark's Pat. Faucets.....	dis 25 c
Taylor's Petroleum Faucets.....	dis 20 c to 25 10 c
Brass Liqueur Cocks.....	dis 20 c to 25 10 c
Best Cutters. —Dixson's.....	dis 15 c
Woodruff.....	dis 15 c
Stowe.....	dis 15 c
Hale's.....	dis 15 c
Stuffs.....	dis 10 c
Planes. —Auburn Tool Co., Benefit.....	dis 40 c
Second Quality.....	dis 40 c
Metallic Plane Co.....	dis 35 c to 35 5 c
Evans' Pat. Circular.....	dis 35 c
Plumb and Levels. —Adjustable.....	dis 60 c to 60 10 c
Soa-Adjustable.....	dis 60 c to 60 10 c
Plane Irons. —American.....	dis 10 c
Butcher's.....	dis 10 c
Picks.....	dis 10 c
Rules. —Cast Steel Garden.....	dis 60 c to 60 10 c
Malleable Garden.....	dis 60 c to 60 10 c
Wood Head Iron Teeth.....	dis 40 c
Steady.....	dis 40 c
English Pattern.....	dis 40 c
No. 0.....	dis 40 c
No. 0.....	dis 40 c
No. 0.....	dis 40 c
Scissors. —Golden Clipper, Damascus Blade, Boxed.....	dis 10 c
Sharpened.....	dis 10 c
Golden Clipper No. 10, Boxed and Sharpened.....	dis 10 c to 15 c
Green Clipper No. 5, Boxed and Sharpened.....	dis 10 c to 15 c
Common Scissors.....	dis 10 c to 15 c
Saws. —Steel and Iron, new list.....	dis 50 c
Dixson's Hand.....	dis 15 c
W. McNece & Co. Cross-Cut & Chisel, new list.....	dis 15 c
Boydton's Lightning, new list.....	dis 15 c
Champion.....	dis 15 c
Shovels and Spades. —Rowland's Plain Back, Jan. 2nd.....	dis 25 c
—Back Scrap.....	dis 25 c
Oliver Ames & Son's.....	dis 25 c
Brady Shovel.....	dis 25 c
Shed Irons. —Richmond (polished face).....	dis 15 c to 15 5 c
Richmond (polished face).....	dis 15 c to 15 5 c
Stone.....	dis 15 c
Turkey Oil, No. 1.....	dis 15 c
Washita Extra.....	dis 15 c
No. 1.....	dis 15 c
Enamelled Ware.....	dis 15 c

Screws. —Iron.....	new list, April 1st, 1875, dis 62 1/2 c
brass.....	dis 62 1/2 c
Spoons. —Brianna's, Boardman's (new list).....	dis 60 c to 50 c
Parkers (old list).....	dis 50 c to 40 c
German Silver.....	dis 35 c
Lalanc & Grosvenor Iron.....	dis 10 c
Springer's Iron.....	dis 50 c to 50 10 c
Torrey's Door.....	dis 10 c to 10 5 c
Sticks and Dies. —Polish.....	dis 10 c to 10 5 c
Onyx.....	dis 10 c to 10 5 c
Try Squares. —Waterbottom.....	dis 10 c to 10 5 c
Stanley Rule and Level Co.....	dis 10 c to 10 5 c
Willis Threl, No. 2.....	dis 10 c to 10 5 c
Dixson's No. 2.....	dis 10 c to 10 5 c
Threl, & Co., Half Weight.....	dis 10 c to 10 5 c
Clout and Finishing Nails.....	dis 10 c to 10 5 c
Traps. —Genuine Onions—Newhouse list.....	dis 20 c
Infant.....	dis 20 c
Viewers. —Solid Box, currency.....	dis 20 c
Wrenches. —Crescent.....	dis 40 c to 40 5 c
Crescent Wrought Bar.....	dis 50 c to 50 10 c
Mallean Bar.....	dis 50 c to 50 10 c
Tafts Pattern (Wrought Bar).....	dis 70 c to 70 10 c
Philadelphia Tool Co.'s Pat. Duplex.....	dis 25 c
Improved Bar.....	dis 25 c
Wire. —No. 0 to 18.....	(Advanced April 24th) dis 25 c
No. 19 to 26.....	dis 25 c
No. 27 to 36.....	dis 25 c
Tinned Broom Wire.....	dis 15 c to 20 c
Galvanized Wire No. 1 to 18.....	dis 40 c

BUFFALO.

Augers. —Shel Mfg. Co.....	dis 25 c
Axes—Fray & Clark's.....	dis 25 c
Alte, Auger—Snel Mfg. Co.....	dis 25 c
Bells, Cow—Yaw & Co.....	dis 25 c
Braces—Rit, Spottard's patent.....	dis 25 c
Boards—Stove, Brooks' Pat. dis 25 c to 30 c	dis 25 c to 30 c
Butts—Broad, Loose Joint.....	dis 30 c
Wrought Nutter.....	dis 30 c
Table and Back Plane.....	dis 30 c
Beatty's Rubber.....	dis 30 c
Leather, new flat, oak tanned.....	dis 30 c
Stick—Bath (box of 2 doz) Best quality.....	dis 30 c
Can Opener—Sprague's.....	dis 50 c
Cases—Parlor Coal Rod.....	dis 15 c
Chalk—White, Carpenter's.....	dis 15 c
Chisel—Finner's.....	dis 15 c
Corner Socket Chisel.....	dis 15 c
Slack & Carpenter's.....	dis 15 c
Castings—Malleable.....	dis 15 c
Egg Beaters.....	dis 15 c
Elbows—Corrugated.....	dis 50 c
Charcoal.....	dis 50 c
Russia.....	dis 50 c
Files—Machos Bros.....	dis 50 c
Flutes—Geneva Hand.....	dis 50 c
Presses—Ice Cream.....	dis 50 c
Hammers—Henry W. Kip's.....	dis 50 c
Hinges—Gates—Shepard's.....	dis 50 c
Hinges—Window Hinge.....	dis 50 c
Shepard's and Standard.....	dis 50 c
Wrought Strap and T.....	dis 50 c
Hods, Coat—Plain, Black and Galval.....	dis 50 c
Funnel, Black and Galvanized.....	dis 50 c
Fancy and Helmet.....	dis 50 c
Salt Irons.....	dis 50 c
Kettles—Brass.....	dis 50 c
Copper, Hand Made.....	dis 50 c
Knives.....	dis 50 c
Knives, Drawing—Oval No. 1.....	dis 50 c
Lanterns—Peckers.....	dis 50 c
Tunmer.....	dis 50 c
Machines—Abbie Paring "Keystone".....	dis 50 c
Machines—Boring, Snel.....	dis 50 c
Miles, Cutter—Box and side, common.....	dis 50 c
Box Union and Eagle.....	dis 50 c
American.....	dis 50 c
Messases Gates—Self Measuring.....	dis 50 c
Nails—Clout and Finishing.....	dis 50 c
Shoe.....	dis 50 c
Horse, Amble.....	dis 50 c
No. 0.....	dis 50 c
Pointed & Polished.....	dis 50 c
Clinton.....	dis 50 c
Packing—Rubber.....	dis 50 c
Paint—White Lead, U. S. Gov't.....	dis 50 c
Paint—Dipping.....	dis 50 c
Rivets—Iron, Black and Tinned.....	dis 50 c
Screws—"American Screw Co".....	dis 50 c
Flat Head, Iron.....	dis 50 c
Flat Head, Steel.....	dis 50 c
Skates and Straps—White's.....	dis 50 c
Spoons, Iron Tinned.....	dis 50 c
Plated Rogers' A. No. 1.....	dis 50 c
Britannia.....	dis 50 c
Squares—Steel and Iron.....	dis 50 c
Scales—Buffalo Scale Works.....	dis 50 c
Fairbanks.....	dis 50 c
Stove Polish—Gem.....	dis 50 c
Tacks—Half Weight Am. Iron.....	dis 50 c
Tacks—Palace Coal.....	dis 50 c
Vices.....	dis 50 c
Parallel, Buffalo, Old pattern, dis 30 c, new, dis 20 c	dis 30 c, new, dis 20 c
Ware—French, Tinned and Iron.....	dis 50 c
Stamped and Jammed.....	dis 50 c
Cast Iron Hollow.....	dis 50 c
Wire—Hessmer Steel.....	dis 50 c
Plates. —Add for each.....	dis 25 c
10x14, 14, Charcoal.....	dis 25 c
12x12.....	dis 25 c
12x12.....	dis 25 c
12x12.....	dis 25 c
Pip Tin—Strata.....	dis 25 c
Bar Tin.....	dis 25 c
Solder. —No. 1, Crook's.....	dis 16 c
Sheets.....	dis 16 c
Lasalle.....	dis 16 c
Rabbit Metal.....	dis 16 c
Iron Wire. —Bright and Annealed.....	dis 45 c
Copper.....	dis 45 c
Tinned.....	dis 45 c
Tinned Broom.....	dis 45 c
Copper—Sheeting 14 to 18 oz.....	dis 30 c
Planished.....	dis 30 c
Bottom.....	dis 30 c
Brass.....	dis 30 c
Sheet Iron. —18 Common.....	dis 45 c
21 Common.....	dis 45 c
24 Common.....	dis 45 c
21 W. Wood & Co., Smooth Finish.....	dis 50 c
Am. Russia.....	dis 50 c
Gen. Russia, No. 1, standard.....	dis 15 c
Galvanized.....	dis 15 c

CINCINNATI.

Tin Plate. —L. C. 10x14 Charcoal.....	dis 50 c to 11 50 c
L. C. 10x14 Charcoal.....	dis 50 c to 11 50 c
L. C. Term 20x28.....	dis 50 c to 11 50 c
L. C. 20 inches Continuous.....	dis 50 c to 11 50 c
Black Tin. —Pic.....	dis 25 c
Bar.....	dis 25 c
Solder. —No. 1.....	dis 16 c
Roofing.....	dis 16 c
S. & Co.....	dis 16 c
Bar.....	dis 16 c
Copper. —Ingot.....	dis 34 c
Planished.....	dis 34 c
Sheeting.....	dis 34 c
Copper Drop.....	dis 34 c
Sheets, 6 to 7 lb.....	dis 34 c
10 to 12 lb.....	dis 34 c
18 lb, up.....	dis 34 c
Copper Sheet.....	dis 34 c
Case, 100 lbs.....	dis 10 c to 11 c
Slab.....	dis 10 c to 11 c
Brass—Roll, No. 6 to 30.....	dis 30 c
Roll, No. 30 to 36.....	dis 30 c
Wire, No. 0 to 30.....	dis 30 c
Wire, No. 30 to 36.....	dis 30 c
Babbitt Metal. —Sellew & Co.....	dis 30 c
Alloy.....	dis 30 c
Market.....	dis 30 c
Antimony.....	dis 12 c
Nickel.....	dis 12 c
Russia Iron—Bonds.....	dis 12 c
Less than bundle.....	dis 12 c
No. Stained.....	dis 12 c
Sheet Iron. —Com. B. Fin. & L. U. D. Ref'd.....	dis 75 c
15 to 20.....	dis 75 c
22 to 24.....	dis 75 c
26 to 28.....	dis 75 c
30.....	dis 75 c
Galvanized Iron—Full bundles.....	dis 25 c
No. 12 to 20.....	dis 25 c
22 to 24.....	dis 25 c
26 to 28.....	dis 25 c
30.....	dis 25 c
Bar Steel—Silver, 8 lb.....	dis 35 c
Iron Wire.....	dis 35 c
Enamelled Ware.....	dis 35 c

One Piece Corrugated Elbows.	dis 10 c
Chacoal Iron.....	dis 10 c
Russia Iron.....	dis 10 c
Plated.....	dis 10 c
5 1/2 inch.....	dis 10 c
6 inch.....	dis 10 c
8 inch.....	dis 10 c
10 inch.....	dis 10 c
Leader Elbows, Flat Crimp Retained or Galvanized. —Dis 10 c.....	dis 10 c
2 inch.....	dis 10 c
3 inch.....	dis 10 c
4 inch.....	dis 10 c
Sheet Iron Bread Pans.	dis 10 c
American Broilers.....	dis 10 c
Plumbers' Machines.....	dis 10 c
Bad Irons.....	dis 10 c
Brass Kettles—Anonia.....	dis 10 c
Dog Irons.....	dis 10 c

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Phillips, H. B. Newhall, 11 Warren St., New York Agent.	
Iron, standard list, assorted sizes, for large orders, special discounts to include Bands, small Rounds and Ovals, 1/2 c. rate, 2 1/2 off net.	
Flat Rail (1 1/2 x 1/2), punched and con'unk.....	dis 10 c
Iron Wedges.....	dis 10 c
Norway Nail Rods.....	dis 10 c
Crow Bars (in order from 1/2 to 1 1/2).....	dis 10 c
Wedge "or" Pinch point.....	dis 10 c
Beetle Kings.....	dis 10 c
Fence Fickets.....	dis 10 c
1/2 round, bent to shape, 25c # ft. of fence, less 15 c off net.	
Carriage and Tire Bolts.	dis 10 c
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.....	dis 10 c
Stove Bolts.....	dis 10 c
Machine and Square Head Bolts.....	dis 10 c
Coch and Lag Screws.....	dis 10 c
Bolt Ends.....	dis 10 c
Pat. Hot Pressed Square and Hexagon Nuts.....	dis 10 c
Large sizes, from 1/2 to 1 1/2 in. diam. 3/4 c # off net.	
Pat. Hot Pressed Square and Hexagon Nuts.....	dis 10 c
Large sizes, from 1/2 to 1 1/2 in. diam. 3/4 c # off net.	
Small sizes, from 1/4 to 1/2 in. diam. 3/4 c # off net.	
Washers, all made from new band iron.....	dis 10 c
Large sizes, from 1/2 to 1 1/2 in. diam. 3/4 c # off net.	
Nuts and Washers in 25 lb. boxes, 1/2 c # ex. Nuts and Washers in lots less than one keg each size, 3/4 c # ex. Nuts and Washers in 10 boxes, 1/2 c # ex. Nuts and Washers in	

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CLASSES 1, 21, 22,
rean Exhibition of Industry
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MEDAL OF HONOUR,
SOCIETY OF ARTS & INDUSTRY,
LONDON, 1866.

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UNIVERSAL
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Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURN

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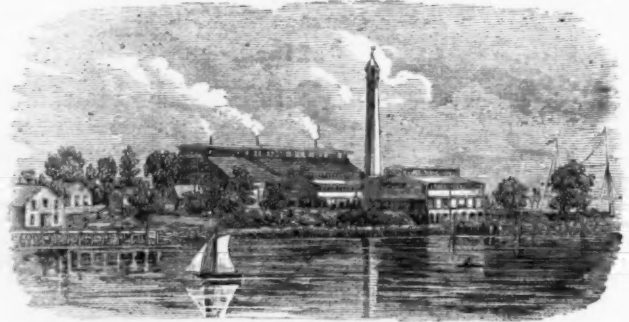
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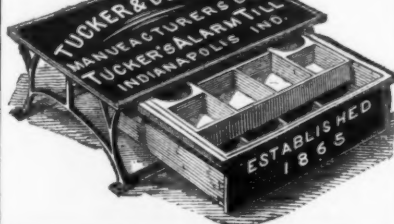
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No. 1, \$2.00; No. 2, \$3.00; No. 3, \$4.00.....dis 30 1/2

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Nail.—No. 1, 3c; No. 2, 2c; No. 3, 1c; No. 4, 1 1/2c.....dis 30 1/2

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No. 1, 10c; No. 2, 15c; No. 3, 20c.....dis 30 1/2

No. 1, 10c; No. 2, 15c; No. 3, 20c.....dis 30 1/2

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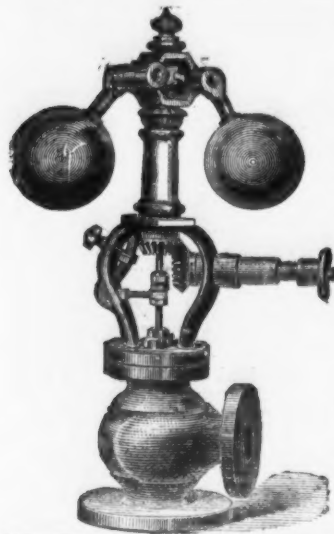
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TO ALL WHO USE STEAM-POWER!

We will put our Governor on any engine, and guarantee it to prove itself superior to all others. If, after a fair trial, it does not, we will take it off at our own expense.

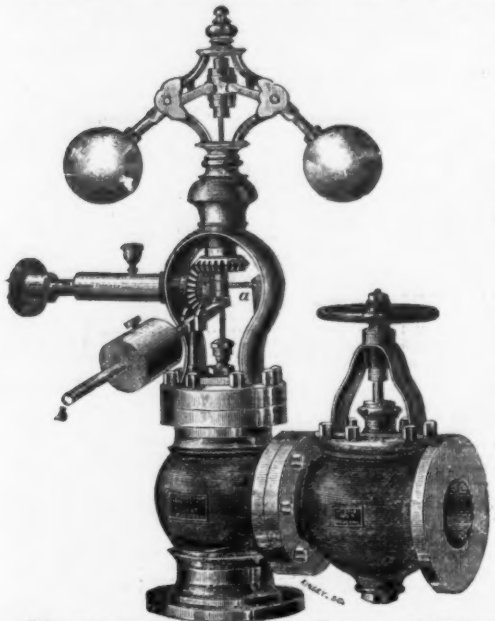
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The Best and Cheapest Watcher of the Watchman made.
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1/2	18 00	20 00	17 00
3/4	20 00	22 00	19 00
1	24 00	27 00	23 00
1 1/4	29 00	32 00	27 00	5 25	6 50
1 3/4	34 00	38 00	31 00	8 50	10 00
2	41 00	45 00	38 00	11 50	13 00
2 1/4	47 00	51 00	44 00	16 00	17 00
2 3/4	50 00	55 00	47 00	17 00	19 00
3	55 00	60 00	52 00	19 00	21 00
3 1/4	63 00	68 00	60 00	22 00	24 00
3 3/4	71 00	76 00	68 00	27 00	29 00
4	81 00	86 00	78 00	32 00	34 00
4 1/4	91 00	96 00	86 00	37 00	39 00
4 3/4	102 00	107 00	94 00	42 00	44 00
5	109 00	114 00	101 00	48 00	50 00
5 1/4	116 00	121 00	108 00	50 00	52 00
5 3/4	124 00	129 00	116 00	55 00	57 00
6	160 00	165 00	152 00	60 00	62 00
7	199 00	204 00	191 00	68 00	70 00
8	230 00	235 00	217 00	75 00	78 00

No Charge for Box and Cartage.

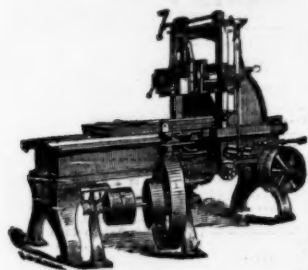
It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

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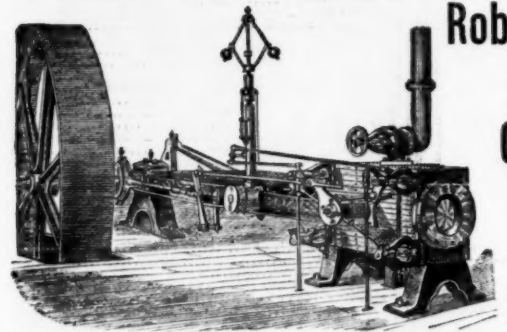
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Have constantly on hand and making

Drop Hammers



Of recently improved construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



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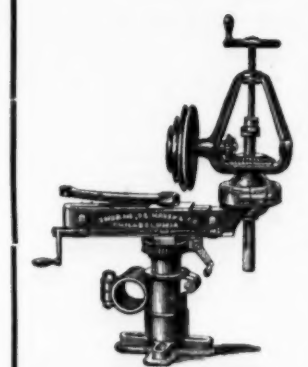
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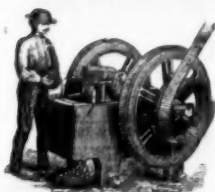
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PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.
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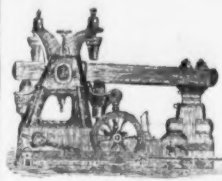
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Has Larger Capacity,

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Manufacturers of the Celebrated

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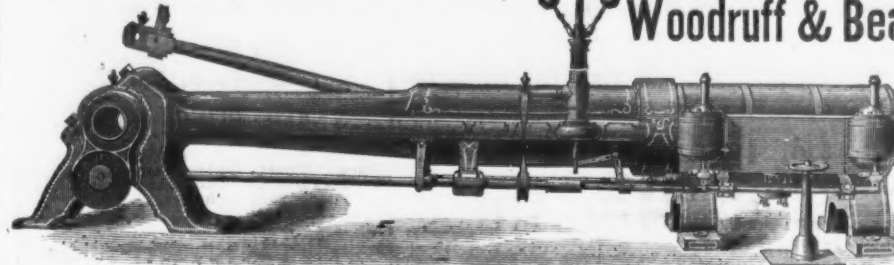
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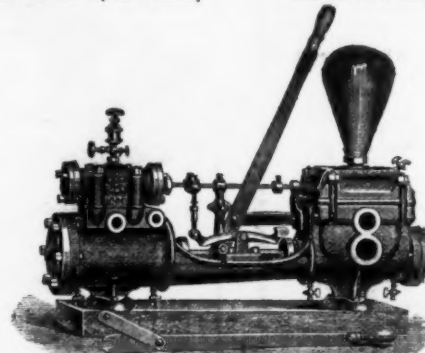
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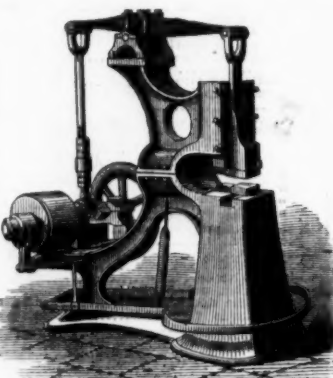
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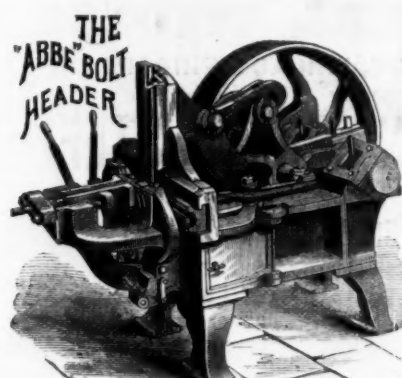
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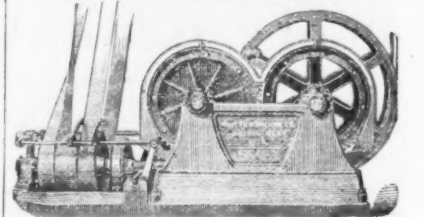
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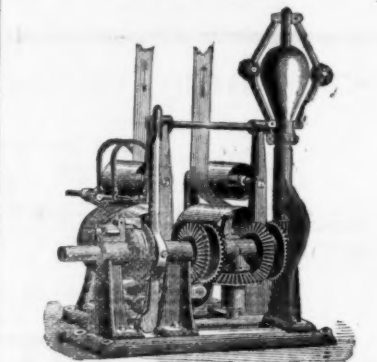
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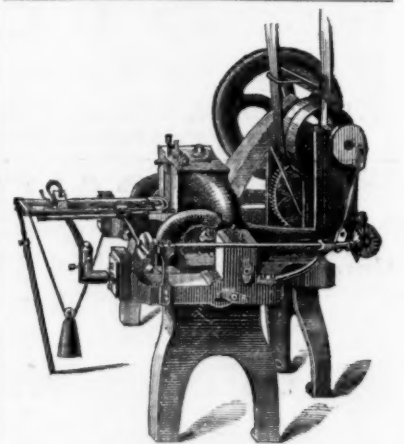
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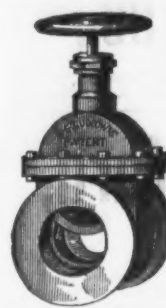
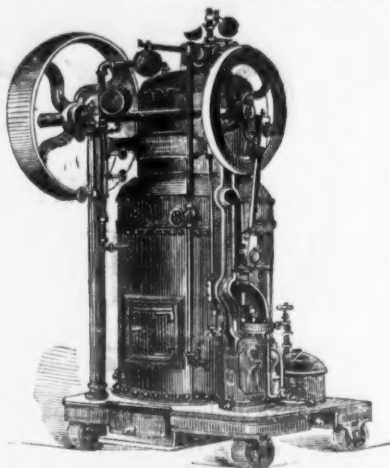
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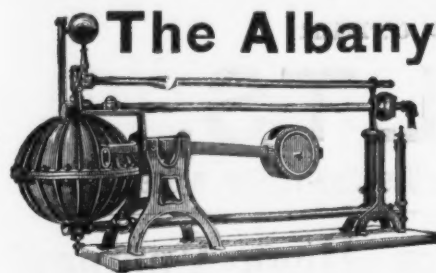
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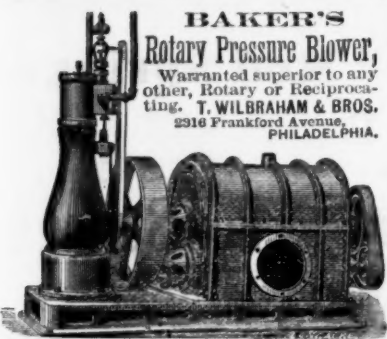
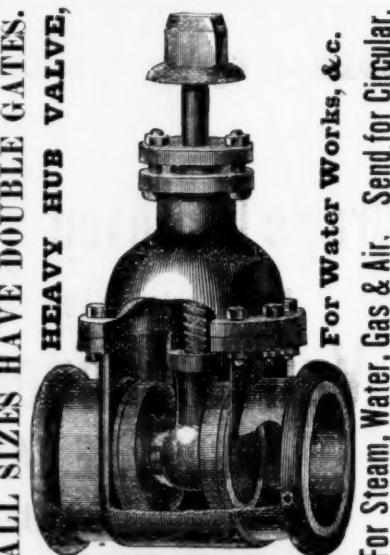
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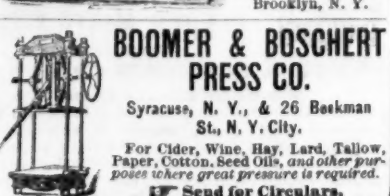
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Warranted superior to any
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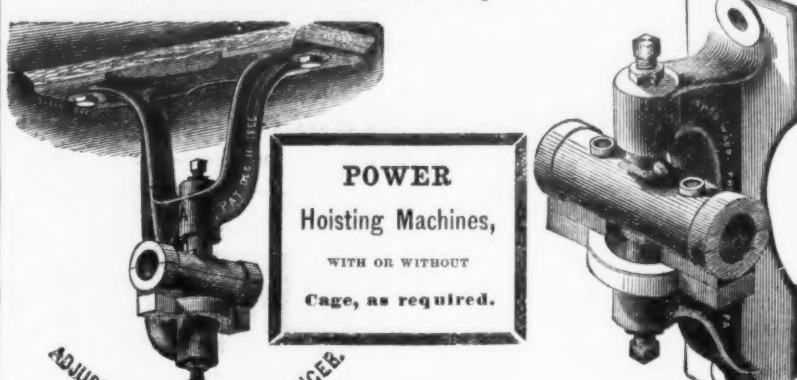
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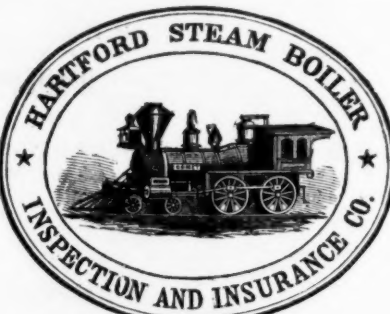
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6 in. from post to center of shaft.MANUFACTURES AS SPECIALTIES,
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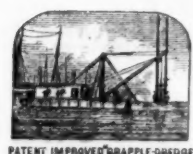
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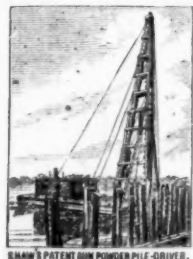
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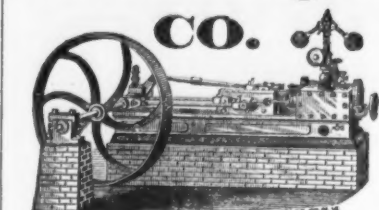
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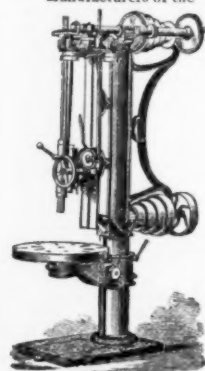
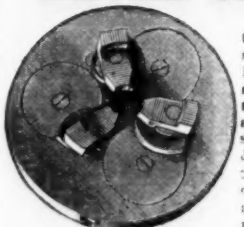
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